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Department of Environmental Protection

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Prevention of Significant Deterioration Permit

Fact Sheet

Exelon West Medway II Project
Summer Street
Medway, MA

December 19, 2016

MassDEP hereby issues this Prevention of Significant Deterioration ("PSD") Permit Fact Sheet, concurrently with the Final PSD Permit and the Final Massachusetts Air Quality Plan Approval for the Exelon West Medway II Project ("Project")[1]. MassDEP based its permit decisions on the information and analysis provided by Exelon West Medway, LLC and Exelon West Medway II, LLC (collectively, "the Applicant" or "Exelon") and MassDEP's own technical review. This Fact Sheet documents the information and analysis MassDEP used to support its PSD Permit decisions. It includes a description of the proposed Project, the applicable PSD regulations, and an analysis demonstrating how the Applicant complied with all applicable requirements.

The Final Air Quality Plan Approval issued concurrently also describes the proposed modification and proposes, among other things, best available control technology, lowest achievable emission rate, emission offsets, emission control systems, emission and other limits, a declining annual CO_{2e} emissions cap on all Project greenhouse gas (GHG) sources, continuous emission monitoring, and record keeping, reporting and testing requirements, in accordance with 310 CMR 7.00: Appendix A, 310 CMR 7.02 and 40 CFR 52.21.

An air quality impact analysis submitted as part of the applications shows that air emissions from the West Medway Generating Station, after construction and operation of the proposed modification, will not cause a violation of federal and state Air Quality Standards, any MassDEP Air Toxics guidelines, nor exceed PSD increments. MassDEP has determined that air emissions from the modified West Medway Generating Station will meet best available control technology and the applicable lowest achievable emission rate technology standards and will meet applicable federal emission standards for Hazardous Air Pollutants.

Finally, MassDEP has included in this Plan Approval requirements that create annual declining CO2e limits on all sources of greenhouse gas included in the Project. Exelon shall comply with the declining annual CO2e limits by either controlling the Project's operations to limit actual CO2e emissions below the applicable year's CO2e limit, or use over-compliance credits created when the Project's actual annual project-wide emissions of CO2e are less than the Project's applicable year's CO2e limit. The requirements are designed so the Project will not emit GHG emissions that may cause or contribute to a condition of air pollution, or cause damage or threat of damage to the environment, as required by the state Clean Air Act, M.G.L. c. 111, §§ 142A-142E, MassDEP air regulations, 310 CMR 7.00, and M.G.L. c. 21A, § 2 and 8. The requirements are also designed so the Project will help achieve the 2020 mandate to reduce GHG emissions by 25% from 1990 emission levels, and the 2050 mandate for an 80% reduction from 1990 emission

[1] Hereinafter the new installation, the subject of the PSD Permit, will be termed the 'Project,' and the existing and new installations together will be termed the 'Facility.'

levels as required by the Global Warming Solutions Act ("GWSA"), M.G.L. c. 21N, and as emphasized by the decision by the Supreme Judicial Court in *Kain v DEP*, 474 Mass. 278 (2016) ("*Kain*"). To demonstrate compliance with the declining annual CO2e limits, MassDEP has incorporated monitoring, recordkeeping and reporting requirements into the Plan Approval.

Furthermore, MassDEP was directed by Governor Baker to finalize regulations, effective on or before August 11, 2017, to impose annual declining GHG emission limits on multiple sectors in the Commonwealth (see Executive Order 569) [2] On December 16, 2016, MassDEP proposed for public hearing and public comment regulations to meet Section 3(d) requirements, Executive Order 569 and the Kain decision. In the proposed regulations, MassDEP takes into account GHG emissions from existing and new facilities in the electric generation sector. After input from stakeholders on the Section 3(d) regulations during the notice and public comment process required under M.G.L. c. 30A, MassDEP intends to finalize Section 3(d) regulations that, along with other measures MassDEP has already adopted or proposes to adopt, will ensure that statewide GHG emissions will meet the 2020 goals of the GWSA and the Kain decision. Therefore, MassDEP has included a provision in this Plan Approval that provides notice to Exelon that the annual declining CO2e limits included in this Plan Approval will be superseded by the applicable conditions included in Section 3(d) regulations when adopted.
Please review the entire Plan Approval, as it stipulates the conditions with which Exelon must comply in order to operate the Project in compliance with this Plan Approval.

I. GENERAL INFORMATION

Name of Source:	Exelon West Medway II
Location:	Medway, Massachusetts
Applicant's Name and Address:	Exelon West Medway, LLC and Exelon West Medway II, LLC 300 Exelon Way Kennett Square, PA 19348
Application Prepared By:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754

Prevention of Significant Deterioration Application

[2] http://www.mass.gov/governor/legislationexecorder/execorders/executive-order-no-569.html

Transmittal Number: X265409
Application Number: CE-15-016

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MassDEP administers the federal PSD Program pursuant to the "Agreement for Delegation of the Federal PSD Program by EPA to MassDEP" ("PSD Delegation Agreement") between MassDEP and the US Environmental Protection Agency Region 1. The PSD Delegation Agreement directs that all PSD Permits issued by MassDEP under the Agreement follow the applicable procedures in 40 CFR 52.21 and 40 CFR 124 regarding permit issuance, modification and appeals.

On August 24, 2015, Exelon submitted an initial Application to MassDEP requesting a PSD Permit for construction of two (2) new, simple-cycle combustion turbines (100 megawatts ("MW") each) with a combined net nominal electrical output of 200 MW, an emergency generator engine, and an emergency fire pump engine (the "Project"). The Project will be located on approximately 13 acres within the existing 94-acre West Medway Generating Station site on Summer Street in Medway, Massachusetts. Exelon submitted a revised Application on September 30, 2015 as well as additional information on February 23, 2016, April 1, 2016, April 13, 2016, May 2, 2016, May 4, 2016, May 6, 2016 and May 9, 2016, and a revised application, consolidating all information. MassDEP considered the Application for the PSD Permit to be administratively and technically complete. As such, on October 12, 2016, MassDEP issued the draft PSD Fact Sheet and a Draft PSD Permit for a 30 day public comment period as required by the PSD Delegation Agreement and 40 CFR 124 - Procedures for Decision Making. The public hearing was held on November 15, 2016 and the public comment period closed on November 23, 2016.

The Project is also subject to the MassDEP Plan Approval and Emission Limitations requirements under 310 CMR 7.02 and Emission Offsets and Nonattainment Review under 310 CMR 7.00: Appendix A ("Appendix A"). MassDEP also issued a proposed Air Quality Plan Approval under these regulations concurrent with the draft PSD Fact Sheet and Draft PSD Permit.

II. PROJECT LOCATION

The approximately 13-acre Project site is located within the existing West Medway Generating Station ("Facility") at 9 Summer Street in the Town of Medway. The Project site is located entirely within the Town's Industrial II zoning district. The Facility covers approximately 94 acres in total and is located in the West Medway section of the Town, to the east of Interstate 495 and to the north of the Town of Bellingham. The Facility is located south of Route 109 (Milford Street), west of Route 126 (Summer Street), and north and east of West Street. The Project site is located south of the existing West Medway Generating Station. Eversource Energy holds an easement on approximately 54 acres of the Facility property, on which it owns and operates transmission and switchyard facilities. The Project site is located to the northeast and east of the Eversource facilities.

The Project will be located in an area whose air quality is classified as either "attainment" or "unclassifiable" for sulfur dioxide ("SO_2"), nitrogen dioxide ("NO_2"), carbon monoxide ("CO"), particulate matter with diameters less than 10 microns ("PM_{10}"), particulate matter with diameters less than 2.5 microns ("$PM_{2.5}$"), and lead. Therefore, the Project is located in a PSD area for these pollutants. The purpose of the PSD program is to protect public health and welfare in areas that have good air quality, to allow economic growth consistent with preserving existing air quality and to assure careful evaluation of any decision to allow increased air emissions after informed public participation.

MassDEP is issuing a Final Comprehensive Plan Approval for the Project under the Emission Offset and Nonattainment Review requirements 310 CMR 7.00: Appendix A concurrently with the Final PSD Permit. This applies because the entire Commonwealth of Massachusetts, including Norfolk County, is in the Ozone Transport Region and is required to comply with Nonattainment Review requirements under 42 U.S.C. § 7511c.

III. PROPOSED PROJECT

Exelon is proposing to install two General Electric ("GE") LMS100 combustion turbine generators, each with its associated exhaust stacks, inlet air filter, intercooler, vent stack for the intercooler, air cooled heat exchangers for the intercooler and lube oil. Proposed air pollution control equipment includes selective catalytic reduction ("SCR") with ammonia injection to reduce nitrogen oxides emissions, and oxidation catalysts to control carbon monoxide and

volatile organic compound emissions for each combustion turbine. Electrical equipment includes a three-winding main generator step-up transformer, an auxiliary transformer, and electrical switchgear.

The Project also includes a number of additional systems and components. These include: a single building housing the control room, a maintenance and warehouse area, and a trailer-mounted demineralizer system; an enclosed gas compressor station with adjacent gas yard; a 950,000-gallon aboveground Ultra Low Sulfur Diesel ("ULSD") fuel storage tank; a 500,000-gallon fire/service water storage tank; a 450,000-gallon demineralized water storage tank; a 12,000-gallon fully diked and covered aqueous ammonia storage tank; and a stormwater detention pond.

Continuous emissions monitoring systems will sample, analyze and record nitrogen oxides, carbon monoxide, and ammonia emission concentration levels as well as fuel firing rates. The combustion turbines will discharge exhaust gases through individual 160-foot tall 13-feet diameter stacks.

Ancillary equipment at the Project will include two additional fuel combustion emission units:

- 603 brake horsepower ("BHP") emergency generator engine firing ULSD (Caterpillar C15 or equivalent); and

- 197 BHP fire pump engine firing ULSD (Clarke JU6H-UFAD or equivalent).

The Project is designed to operate based on dispatch orders from ISO New England (ISO-NE) consistent with ISO-NE's efforts to provide low-cost electric energy to consumers, maintain operating reserve, and coordinate transmission and generation outages. A facility with the Project's characteristics such as quick-starting and its particular efficiency relative to other generators is likely to operate during such circumstances as peak electrical energy demand. Exelon has proposed to limit the Project to operating no more than 60% of the time each year. As a non-baseload unit under the Federal New Source Performance Standard for greenhouse gas emissions from electric generating units (40 CFR 60 Subpart TTTT), Exelon has also requested the Project be limited to net electric sales of 471,000 megawatt hours per year for each combustion turbine over a 3-year rolling average (43% of the time). Exelon proposes to use natural gas as the primary fuel, with the ability to use ULSD as a backup for up to 720 hours or 30 days (at the equivalent of 100% load or 5,150,800 million British thermal units heat input per 12-month rolling period).

While the Project is designed for unlimited starts and stops, Exelon used 450 starts/stops per turbine firing natural gas and 50 starts/stops per turbine firing ULSD to determine potential emissions and for air quality dispersion modeling.

Each combustion turbine will have a maximum heat input rate of 980 million British thermal units per hour ("MMBtu/hr") at ISO conditions[3] and a nominal net power output of 100 MW while firing natural gas. The maximum heat input rate will be 946 MMBtu/hr when firing ULSD.

The emergency generator engine and the emergency fire pump engine will each be limited to no more than 300 hours of operation per rolling 12-month period unless MassDEP amends 310 CMR 7.26(42)(d)1, which is the basis of the 300 hour limitation. If MassDEP does amend the regulation, the engines will be subject to the new requirements, if any. Each engine is also subject to the operating limitations specified in 40 CFR 60, Subpart IIII for emergency engines (including a 100-hour limit for non-emergency operation per calendar year.) Exelon assumed the emergency engines would operate 300 hours to calculate emissions.

IV. PSD PROGRAM APPLICABILITY AND REVIEW

MassDEP administers the PSD Program in accordance with the provisions of the April 11, 2011 PSD Delegation Agreement between MassDEP and EPA which states that MassDEP agrees to implement and enforce the federal PSD regulations in 40 CFR 52.21.[4]

Review considerations with respect to Appendix A are not part of the PSD Review Process and are therefore not addressed in this Fact Sheet. MassDEP provides its evaluation of Emission Offsets and Nonattainment Review for the Project, as required by Appendix A, in the Final Comprehensive Plan Approval ("CPA"), also issued by MassDEP concurrently with this PSD Fact Sheet and the Final PSD Permit.

The PSD regulations at 40 CFR 52.21 require that a major new stationary source of an attainment pollutant, or major modification to an existing major stationary source of an attainment pollutant, undergo a PSD review and that a PSD Permit be granted before commencement of construction. 40 CFR 52.21(b)(1) of the federal PSD regulations defines a

[3] ISO conditions are 59°F, 14.7 psia and 60% humidity.
[4] Section III. Scope of Delegation, Section A., states, "Pursuant to 40 CFR 52.21(u), EPA hereby delegates to MassDEP full responsibility for implementing and enforcing the federal PSD regulations for all sources located in the Commonwealth of Massachusetts, subject to the terms and conditions of this Delegation Agreement."

"major stationary source" as either (a) any of 28 designated stationary source categories with potential emissions of 100 tons per year ("tpy") or more of any regulated attainment pollutant, or (b) any other stationary source with potential emissions of 250 tpy or more of any regulated attainment pollutant.[5] The existing West Medway Generating Station is not covered by any of the 28 listed source categories and has potential emissions of 250 tons per year or more of NOx and CO. Therefore, it is an existing major source.

The Project is a major modification of an existing major source (see the PSD Applicability section below). As such, PSD review applies to each PSD pollutant emitted in excess of a defined Significant Emission Rate. Further, if greenhouse gas ("GHG") emissions expressed as carbon dioxide ("CO_2") equivalent (or "CO_2e") are greater than 75,000 tpy for a project that is already a PSD modification, then GHG are also included as a PSD pollutant.

Accordingly, Exelon must apply for and obtain a PSD Permit that meets regulatory requirements including:

- Best Available Control Technology ("BACT") requiring sources to minimize emissions to the greatest extent practical;
- An ambient air quality analysis to ensure all the emission increases do not cause or contribute to a violation of any applicable PSD increments or National Ambient Air Quality Standard ("NAAQS");
- An additional impact analysis to determine direct and indirect effects of the proposed source on industrial growth in the area, soil, vegetation and visibility; and
- Public comment including an opportunity for a public hearing.

V. PSD APPLICABILITY

The Project is a major modification as defined by EPA's PSD program. Potential emissions from the Project are significant for six different PSD pollutants: NOx, PM, PM_{10}, $PM_{2.5}$, sulfuric acid ("H_2SO_4") mist, and GHG. Table 1 shows potential emissions from the proposed new equipment at the site and total Project potential to emit relative to the PSD significant emission rates.

[5] "Determining Prevention of Significant Deterioration (PSD) Applicability Thresholds for Gas Turbine Based Facilities," memorandum from Edward J. Lillis, Chief, Permits Branch, EPA, dated February 2, 1993.

Table 1						
Pollutant	**CTGs[1] (tpy)**	**Emergency Generator Engine[2] (tpy)**	**Fire Pump Engine[2] (tpy)**	**Project-wide PTE (tpy)**	**PSD Significant Emission Rates (tpy)**	**Does PSD apply?**
NOx	65.1	0.6	0.235	65.9	40	**Yes**
VOC	20.5	0.006	0.0078	20.7[3]	40	No
CO	67.3	0.52	0.20	68.0	100	No
SO_2	13.4	0.0011	0.0004	13.4	40	No
$PM/PM_{10}/PM_{2.5}$	58.2	0.034	0.013	58.2	25 PM 15 PM_{10} 10 $PM_{2.5}$	**Yes** **Yes** **Yes**
Lead	0.01	NA	NA	0.01	0.6	No
Fluorides	None expected				3	No
H_2SO_4 mist	12.3	0.0009	0.0003	12.3	7	**Yes**
H_2S	None expected	None expected	None expected	None expected	10	No
Total Reduced Sulfur (including H_2S)	None expected	None expected	None expected	None expected	10	No
Reduced Sulfur Compounds (including H_2S)	None expected	None expected	None expected	None expected	10	No
GHG (as CO_2e)	696,867	116	37	697,049[4]	75,000	**Yes**

Table 1 Key:

CO = Carbon monoxide
CO_2 = Carbon dioxide
CO_2e = Carbon dioxide equivalents
CTGs = Combustion turbines
GHG = Greenhouse gases
H_2S = Hydrogen sulfide
H_2SO_4 = Sulfuric acid mist
NA = Not applicable
NH_3 = Ammonia
NOx = Nitrogen oxides
PM = Particulate matter
$PM_{2.5}$ = Particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = Particulate matter less than or equal to 10 microns in diameter
PSD = Prevention of Significant Deterioration
PTE = Potential to emit
SO_2 = Sulfur dioxide
tpy = tons per year
VOC = Volatile organic compounds

Table 1 Notes:

1. Includes emissions from both combustion turbines firing for up to 5,256 hours per year (60% capacity factor), of which up to 720 hours are firing ULSD, and assumes 450 starts and stops firing natural gas and 50 starts and stops firing ULSD for each combustion turbine.
2. Calculated using 300 hours per year.
3. Includes 0.2 tons per year VOC from working and breathing losses from the ULSD storage tank.
4. Includes 23 tons per year of equivalent GHG fugitive emissions from methane leaks and 6.27 tons per year of equivalent GHG fugitive emissions from sulfur hexafluoride leaks from gas-insulated switchgear.

VI. BACT ANALYSIS

As required by the Federal PSD Program at 40 CFR 52.21(j)(3), "a major modification shall apply best available control technology for each regulated [New Source Review] pollutant for which it would result in a significant net emissions increase at the source. This requirement applies to each proposed emission unit at which a net emissions increase in the pollutant would occur as a result of a physical change of change in the method of operation in the unit." Therefore, the Project is required to apply BACT for the NOx, PM, PM_{10}, $PM_{2.5}$, H_2SO_4, and GHG emissions from the new combustion turbines, the emergency generator engine, and the emergency fire pump engine.

BACT is defined as:

> "an emissions limitation ... based on the maximum degree of reduction for each pollutant subject to regulation under [the Clean Air] Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems and techniques … for control of such pollutant." 40 CFR 52.21(b)(12); 42 U.S.C. § 7479.

BACT determinations involve an evaluation process known as the 'top-down' process. In brief, the 'top-down' process involves a ranking of all available control technologies in descending order of control effectiveness. Applicants are required to first examine the most stringent alternative. MassDEP presumes this emission limit represents BACT unless the applicant can demonstrate that it is not feasible for technical, energy, environmental, or economic reasons. If the most stringent control alternative is eliminated, then the applicant must consider the second best, and so on. The details of this procedure are found in the October 1990 Draft EPA New Source Review Workshop Manual and other EPA policy, guidance, and

determinations as applicable, e.g., as indexed in EPA's on-line NSR Policy and Guidance Database at https://www.epa.gov/caa-permitting/search-air-permit-policy-guidance-databases.

Top-down BACT analysis follows the following five step methodology:

1. Identify all control technologies. Identify all possible control options, including inherently lower emitting processes and practices, add-on control equipment, or a combination of inherently lower emitting processes and practices and add-on control equipment.

2. Eliminate technically infeasible options. Eliminate technically infeasible options based on physical, chemical, and engineering principles.

3. Rank remaining control technologies by control effectiveness. Rank the remaining control options by control effectiveness, expected emission reduction, energy impacts, environmental impacts, and economic impacts.

4. Evaluate most effective controls and document results. Determine the economic, energy, and environmental impacts of the control technology on a case-by-case basis.

5. Select BACT. Select the emission limit associated with the most effective control option not rejected in the above analyses as BACT.

A summary of the results of the BACT analyses for the proposed Project are presented below for NOx, PM, PM_{10}, $PM_{2.5}$, H_2SO_4 mist, and GHG emissions.

A. Combustion Turbines

In order to identify BACT for a dual-fueled simple-cycle CTG, Exelon evaluated numerous sources of information. These sources included both state and federal resources of publicly available air permitting information. Exelon evaluated the following sources of information to determine BACT:

- EPA's RACT, BACT and LAER Clearinghouse ("RLBC") and Control Technology Center;
- Best Available Control Technology Guideline - South Coast Air Quality Management District;
- Control technology vendors;
- Federal, state and local new source review permits and associated inspection/performance test reports;

In addition, Exelon reviewed available information on current and past projects;

- Technical journals, reports and newsletters, air pollution control seminars; and
- EPA's policy bulletin board.

According to the Application, the Project is designed to compete in the capacity and energy markets as a generator with particular value related to its quick-start capability and relatively high efficiency. As such, the Project is capable of providing a full 200 MW of electricity in 10 minutes, operating between 25% and 100% load, and changing load at up to 50 MW per minute. Exelon has demonstrated that combined-cycle turbine technology is not capable of achieving this level of quick start and load following performance. Therefore, MassDEP determined that the BACT analysis need not include an analysis of combined-cycle technologies that would redefine the source. However, for the sake of completeness, this BACT analysis considers certain other technologies as being hypothetically available.

Fuel Selection

Background:

The choice of fuels used to fire the simple-cycle combustion turbines is a major element of the BACT analyses for each pollutant. The fuel choice will affect the emission limits that represent BACT for each pollutant. MassDEP must weigh the same factors when addressing the fuel choice as a control option for each pollutant. Rather than including a fuel choice control option in the BACT analysis for each individual pollutant, this Fact Sheet discusses the fuel choice analysis for the Project, which applies to the emission limits chosen to represent BACT for each pollutant.

Exelon has proposed to burn primarily natural gas in the combustion turbines. However, as a back-up fuel, Exelon has proposed to burn ULSD for up to the equivalent of 720 full-load hours per year. While ULSD is the cleanest burning fossil fuel other than natural gas, pollutant emission rates of NOx, PM, PM_{10}, $PM_{2.5}$, and GHG that result from burning ULSD are higher than from burning natural gas. Emissions of H_2SO_4 mist are expected to be lower while burning ULSD.

Exelon is proposing a 60% capacity factor; that is, operating up to 5,256 hours per year, 720 of which could be ULSD. Further, Exelon is proposing a 43% capacity factor based on net electric sales over a 3-year rolling average.

Step 1: Identify all control technologies.

Exelon identified the following possible fuels for the Project:

- use of only natural gas;
- use of natural gas as the primary fuel, with on-site storage of liquefied natural gas ("LNG") as a back-up fuel;
- Natural gas, with onsite storage of biodiesel backup fuel; and
- Use of natural gas as the primary fuel, with on-site storage of ULSD as the backup fuel.

Step 2: Eliminate technically infeasible options:

The use of only natural gas and the use of natural gas with ULSD backup are both technically feasible.

Exelon demonstrated that the use of LNG as a backup fuel is not technically feasible, because the West Medway site is not large enough to accommodate the size of the LNG facility that would be needed.

Exelon demonstrated that the use of biodiesel as a backup fuel is not technically feasible, because of issues with long-term storage and fuel characteristics.

Step 3: Rank remaining control technologies

Since natural gas is a cleaner fuel than ULSD for all PSD pollutants, the use of only natural gas ranks higher than using natural gas with ULSD backup in terms of control effectiveness.

Step 4: Evaluate most effective controls and document results

1. Energy Impacts: To understand the energy impacts associated with the Project, a brief background on the New England energy market is helpful. The purpose of the Project is to provide additional needed electric capacity to the Southeast Massachusetts – Rhode Island ("SEMA/RI") load zone in the ISO-NE electric grid, in order to help meet the electric demand when demand is at its peak. The Project will also enhance the region's overall electric system and support the future of renewable energy in Massachusetts and the region by providing a quick-starting back-up electric power for intermittent renewable energy sources such as solar and wind.

   ISO-NE operates a Forward Capacity Market ("FCM"), in addition to other markets. The Forward Capacity Market is a wholesale market that assures adequate electric generating resources will be available in the long-term. ISO-NE holds an annual Forward Capacity

Auction ("FCA") in which prospective electric suppliers compete for the opportunity to meet New England's projected electricity demand three years before the operating period subject to the auction. ISO-NE designed the FCA to promote economic investment in electric supply resources. A generating resource that "clears" the action (that is, is among the lowest bidders) has an obligation to produce power when called upon during the operating period three years hence. The bidder makes this commitment in exchange for capacity payments. Long-term capacity markets such as the FCM provide economic incentives to attract investment in new and existing electric generating resources to achieve power system reliability requirements. Capacity payments serve as a stable revenue stream for electric generators, particularly those whose purpose is to meet peak demand and therefore do not operate many hours per year.

In the February 2015 FCA, held to secure electric generating resources for the 2018-2019 operating period, ISO-NE introduced a modification to serve as a catalyst to ensure a sufficiently more reliable and more flexible fleet of electric supply resources, called Pay-for-Performance. ISO-NE determined that the market as previously structured was not providing sufficient financial incentives to ensure electric supplier's performance during the winter when the natural gas supply is sometimes constrained. Electric suppliers sometimes failed to produce energy when ISO-NE called on them in the winter when natural gas was constrained. This posed a serious threat to the electric grid's reliability. Pay-for-Performance creates a stronger financial incentive for electric suppliers to perform when called on during periods of system stress because if a supplier underperforms or does not produce power, it will be required to pay back some or all of its capacity payments through performance penalty payments. Electric suppliers that do perform will share in any revenue ISO-NE collects from non-performers. ISO-NE adopted the penalty and performance payments expressly to create financial incentives for electric suppliers to firm up their winter fuel supply.

On February 2, 2015, Exelon participated in the ISO-NE's FCA 9 with a bid for a 195 MW peaking generator to sell power to the SEMA/RI load zone. The bid "cleared" which means that Exelon now holds a supply obligation in the ISO-NE capacity market. Beginning in June, 2018, the Project must run and produce electricity when ISO-NE calls on it to do so or Exelon will be subject to performance penalty payments, thereby jeopardizing the Project's economic viability. Moreover, ISO-NE is planning on the Project being available to produce electricity by June 2018. If the Project is unable to produce power, the reliability of the electric power system in the SEMA/RI load zone could be in jeopardy. Accordingly, to maintain reliability of the electric grid in the winter months, Exelon must overcome the challenge of the scarce supply of natural gas so that it has fuel to run when called upon.

Of both available fuel choices, which are technically feasible, only the use of natural gas with ULSD backup, will fully meet this challenge, as even a firm contract for natural gas supply would not ensure that natural gas is always available. For example, natural gas may not be available, at any cost, during an emergency, such as equipment malfunctions or issues with the gas supply.

2. Economic Impact: MassDEP considered the cost of using only natural gas at the Project. Two important factors in the cost of natural gas for any natural gas fired electric generator are whether the facility uses an firm or interruptible natural gas supply contract, and whether the supply of natural gas is constrained at any time. With a firm contract, the price of natural gas is always high but natural gas is always available; with an interruptible contract, the price of gas is almost always lower than under a firm contract, but in rare events the interruptible or "spot market" price could exceed the firm contract price. Exelon has stated that a firm contract for the Project would cost an additional $24 million per year over an interruptible contract. Since the total PSD pollutant emissions, except GHG, avoided by burning all natural gas as opposed to 720 hours burning ULSD is 23.4 tons per year, use of only natural gas under a firm contract would cost approximately one million dollars per ton of pollution avoided. This is well outside the range of controls or fuels determined to be cost-effective in previous BACT determinations. Even when natural gas is available, under certain market conditions, natural gas may be so much more expensive than ULSD that natural gas is not a cost effective means of pollution control, or, put another way, the economic impacts of using natural gas over ULSD make its use economically infeasible.

3. Environmental Impact: There are higher emissions of PSD pollutants associated with burning ULSD. Burning ULSD for 720 hours per year instead of burning natural gas will result in an additional 15.3 tons per year of PM, 6.8 tons per year of NOx and more than 25,000 tons per year of CO_2e.[6] Burning ULSD will result in a reduction of sulfuric acid mist emissions calculated using the maximum allowed sulfur content of natural gas. However, MassDEP expects that the actual sulfur content of natural gas used at the Project will be lower than the actual sulfur content of ULSD on a heat input basis, resulting in a slight increase in actual sulfuric acid mist emissions while using ULSD.

   These additional emissions will not cause an unacceptable air quality impact. Exelon analyzed the impact of operating the Project at a 60% capacity factor and burning ULSD for 720 of those hours, among other constraints. The Air Quality Impact Analysis section of this

[6] Compare these tons per year emissions values with the values in the CTG column of Table 1 above for a perspective of the additional emissions compared to maximum annual emissions.

Fact Sheet reflects that analysis and indicates that the Project will meet all applicable air quality standards in all proposed operating scenarios.

The GE LMS100 combustion turbines proposed by Exelon require water injection into the combustion area to control the formation of thermal NOx for dual-fueled turbines. Natural gas only GE LMS100 combustion turbines do not require water injection to achieve the same level of thermal NOx control as a dual-fueled turbine. Consequently, any ULSD use in the combustion turbines significantly increases the Project's water use. Water used to control NOx emissions represents 99% of the Project's water needs. The Project proposes to obtain its water from an on-site well and from one municipal water source, the Town of Millis. Exelon will minimize water use for cooling by utilizing air-cooling rather than water-cooling for the combustion turbine intercooling, lube oil, and gas compressor systems.

Exelon proposed that the Project be authorized to burn ULSD on days in which the cost of ULSD is less than the cost of natural gas. As indicated above, burning ULSD in combustion turbines emits more pollutants than burning natural gas. In support of its request, Exelon stated that the evidence supports its assertion that the Project's use of ULSD on some days is likely to result in a net reduction in regional CO_2e emissions. MassDEP's analysis of the proposal examined the environmental aspects of burning ULSD, particularly any positive environmental aspects of burning ULSD. Again, a brief review of electric markets in New England is instructive. ISO-NE is responsible for meeting the electric demand in New England on a daily basis as economically as possible. Every day, each electric generating plant in New England bids to take part in daily dispatch. A bid mainly reflects a plant's variable operating costs (i.e. the cost of producing a megawatt of electricity not considering the fixed costs, which are covered by the capacity payments mentioned earlier). A plant's variable operating costs are primarily a function of its efficiency[7] and the cost of its fuel. ISO-NE dispatches the electric generating plants needed to meet the electric demand in the region and dispatches those plants on an economic basis. That is, ISO-NE first dispatches the plants with the lowest bids (due to lower variable operating costs) and then adds additional, more expensive plants as needed to meet demand.

On a normal day, when the cost of natural gas is less than or equal to the cost of ULSD, the more efficient plants and burning natural gas will dispatch first, minimizing regional CO_2e emissions. However, on days when the supply of natural gas is constrained and the cost of ULSD is lower than the cost of natural gas, a less efficient plant and operating on less

[7] Efficiency or its reciprocal, heat rate, is a measure of the ability of an electric generating unit to convert the chemical energy content of the fuel into electrical energy. Efficiency or heat rate is often measured in British thermal units fuel energy per kilowatt hour electric output.

expensive ULSD may well be dispatched instead of a higher efficiency plant operating on natural gas that is more expensive. Whether, and how often, this occurs depends on conditions in effect on any day, such as constraints on the supply of natural gas, the relative cost of natural gas and ULSD, the mix of plants operating that day, the locations of those plants and the load zone being served. Because of the higher efficiency of the Project compared to most of the older competing plants, the Project is likely to displace less efficient oil fired plants when economic conditions favor it operating on ULSD.

Exelon presented data to MassDEP showing the CO_2 emissions rates of the generating plants that the Project would likely displace when operating on ULSD. Exelon also presented an example of what could happen in a year when oil prices were consistently higher than gas prices. Exelon modeled the operation of the electric system for the year 2014 – a year in which the cost of natural gas was very high – as if the Project were included in the dispatch mix. The simulation demonstrated that whenever the Project operated on ULSD, it displaced other less efficient generating plants, leading to a net reduction in regional CO_2e emissions. Accordingly, the higher efficiency of the Project makes it more likely that it will produce a net reduction in regional CO_2e emissions when operating on ULSD because it will displace less efficient oil-fired units.

Step 5: Select BACT

As noted above, because using only natural gas ranks higher than using natural gas with ULSD backup, the emission limits associated with natural gas use represents BACT unless eliminated because of economic, energy or environmental reasons. MassDEP weighed all the aspects of using either fuel choice discussed above. Using only natural gas has the advantage of reduced overall emissions and less of an impact regarding water use. But, these advantages come with much higher costs: assuming a firm supply contract is necessary or with the increased possibility that the Project would not be able to operate during those winter periods when natural gas is constrained. The main advantage of using natural gas with ULSD backup is the ability for the Project to operate whenever called upon by ISO-NE, particularly during those winter periods when the weather is cold or even extremely cold, and the reliability of the electric system is more important from a public health perspective than at other times of the year. It is instructive that ISO-NE implemented a financial incentive system to influence generating plants to arrange to have the fuel necessary to operate during these periods.

MassDEP also considered Exelon's proposal to burn ULSD when the cost of ULSD is lower than the cost of natural gas. MassDEP agrees that a newer, more efficient electric generating plant is likely to be dispatched before an older, less efficient plant, particularly when both plants

base their bids in the daily market on burning ULSD. Operating newer and presumably more efficient plants in the New England electric grid is likely to reduce GHG emissions in the region.

Upon review, MassDEP determined that the emission limits associated with the use of natural gas with ULSD backup represents BACT for the Exelon West Medway II Project. The Project will be restricted to the equivalent of a 60% full-load operating capacity factor and operation on ULSD will be restricted to the equivalent of 30 full-load days. Use of ULSD will be limited, in general, to periods when natural gas is more expensive than ULSD, to emergencies, to periods when natural gas is not available, and for testing and maintenance.

Therefore, MassDEP will limit the use of ULSD in the PSD Permit to the following:

A. Up to a maximum of 15 full load equivalent days per turbine during each annual period from July 1 through June 30, outside of the Ozone Season, the new combustion turbines may operate on ULSD when the price of ULSD is less than the price of natural gas for the Project.[8]

B. In addition to the 15 days provided for in paragraph A above, the new combustion turbines may operate on ULSD under the following conditions provided that all ULSD firing, including any firing under paragraph A above, is limited to 30 full load equivalent days per year per turbine:

    1. When ISO-NE declares an Emergency, an Energy Emergency, or a Capacity Scarcity Condition as defined in ISO-NE's Tariff or as referenced in ISO-NE's Operating Procedures No. 4, No. 7, and No. 21;

    2. When natural gas supplies (i) are curtailed by the pipeline operator; (ii) cannot be procured or delivered at any price; or (iii) are not available for purchase or delivery within the timeframe required to support operation of the Project. In this situation, Exelon will use all commercially reasonable efforts to switch to natural gas operation as soon as possible as allowed under ISO-NE market rules and without jeopardizing the safety of equipment or operating personnel;

    3. When the Project is operating on natural gas and the supply or delivery is curtailed by the pipeline operator. In this situation, Exelon will use all commercially reasonable efforts to switch back to natural gas operation as soon as possible as allowed under ISO-NE market rules and without jeopardizing the safety of equipment or operating personnel;

[8] No condition set forth in paragraphs B.1 through B.8 below shall be required to exist in order for the Facility to operate on ULSD for up to the 15 full load equivalent days per turbine noted in paragraph A.

4. In the Real-Time market, when ISO-NE dispatches the Project at or above the Reserve Constraint Penalty Factor price applicable to either the System reserve requirements or local reserve requirements associated with the load zone in which the Project is located;

5. When there is (i) a failure of any equipment (whether on-site or off-site) required to allow the combustion turbines to operate on natural gas; (ii) a physical blockage of the supply pipeline; (iii) or other pipeline or gas supply condition preventing the delivery of gas of appropriate quality and pressure. In this situation, Exelon will use all commercially reasonable efforts to switch back to natural gas operation as soon as possible as allowed under ISO-NE market rules and without jeopardizing the safety of equipment or operating personnel;

6. During commissioning and start-up testing when the combustion turbines are operated on ULSD;

7. For emission testing purposes as specified in the Project's PSD Permit or as required by MassDEP, ISO-NE or for testing required by any other regulatory authority;

8. During testing, modification, repair and maintenance if any equipment requires ULSD operation; and

Operation on ULSD pursuant to paragraphs B.1 - B.7 is allowed at all times. Operation on ULSD pursuant to paragraphs A, and B.8 is allowed only outside of the Ozone Season.

NOx

In addition to the requirement to apply BACT for NOx, the Project is also subject to the determination of Lowest Achievable Emission Rate ("LAER") for NOx because NOx potential emissions exceed the major source threshold under 310 CMR 7.00: Appendix A, Emission Offsets and Nonattainment Review. Please see the Final CPA for the Project for the LAER analysis.

Step 1: Identify all control technologies
Exelon identified the following possible controls options for NOx:

- Selective Catalytic Reduction;
- Selective Non-Catalytic Reduction ("SNCR");

- Multi-pollutant control systems such as EMx (formerly SCONOx) systems;
- Catalytic combustion systems such as XONON systems;
- Low-NOx burners; and
- Good combustion practices.

Step 2: Eliminate technically infeasible options

The BACT analysis concluded that SNCR is not technically feasible for the simple-cycle combustion turbines because of insufficient reactor residence time and the inability to maintain proper temperature across various, rapidly changing loads.

The BACT analysis concluded that the EMx and XONON systems are not technically feasible because they are not available for the size of combustion turbine proposed for the Project.

The BACT analysis also concluded that dry Low-NOx burners are not technically feasible because they are not available for the dual-fueled GE LMS100 combustion turbines proposed for the Project.

Steps 3 and 4: Rank remaining control technologies by control effectiveness

Exelon concluded that SCR, Low-NOx burners with water-injection and good combustion are technically feasible control technologies and proposed to use all three technologies to control NOx emissions from the Project. Accordingly, the BACT analysis did not consider the competing impacts and benefits among the three technologies.

Step 5: Select BACT

Exelon presented available data on simple-cycle NOx combustion turbine emission limits from the information resources listed above. Based on these data, Exelon's analysis concluded that the lowest NOx emission limit for simple-cycle combustion turbines greater than 25 MW is 2.5 parts per million volume dry ("ppmvd") corrected to 15% oxygen when firing on natural gas and 5.0 ppmvd corrected to 15% oxygen when firing on ULSD.

Exelon identified one natural gas only, simple-cycle project, Riverside Energy Resource in Riverside, California, with a NOx emission rate of 2.3 ppm. However, this project involved the smaller 50 MW GE LMS6000 combustion turbines firing natural gas only. Exelon concluded that this limit is neither available nor technically feasible for the 100 MW, dual-fueled GE LMS100 combustion turbine and stated that General Electric will not guarantee the performance

of the LMS100 with such a limit. In addition, the Riverside permit specifically states that the project's proposed emission limit for NOx was a voluntary limit. In permits issued after Riverside, the 2.5 ppm NOx emission limit has been determined to be BACT by the same permitting authority (the South Coast Air Quality Management District) that issued the Riverside permit. Based on Exelon's research, a NOx emission limit lower than 2.5 ppm for simple-cycle combustion turbines has never been imposed by any other permitting authority.

In summary, Exelon proposed a NOx emission limit of 2.5 ppmvd firing natural gas and 5.0 ppmvd firing ULSD. Upon review, MassDEP determined that 2.5 ppmvd at 15% O_2 firing natural gas and 5.0 ppmvd at 15% O_2 firing ULSD based on using SCR, Low-NOx burners and good combustion practices represents BACT for NOx emissions for the Project's proposed combustion turbines.

PM/PM_{10}/$PM_{2.5}$

The BACT analysis reviewed emission limits and control technologies for particulate matter using the conservative assumption that all particulate matter emissions are 2.5 microns aerodynamic particle diameter or smaller. The analysis found that potential control options included fabric filtration, electrostatic precipitation, wet scrubbing, cyclone collection, and side-stream separation. As with all of the pollutants considered for the BACT analysis, the use of clean fuels and good combustion control is another option for emissions control. The use of any of the post-combustion control options is technically infeasible, since the minimum outlet concentration achievable using post-combustion control is generally higher than the inlet concentration achievable using clean fuels. Therefore, the installation of post-combustion controls will not reduce particulate emissions.
The Project will control particulate emissions by burning low ash and low sulfur fuel, using good combustion practices, state-of-the-art combustion technology and operating controls for the proposed dual-fueled, simple-cycle combustion turbines.

Upon review, MassDEP determined that the particulate matter emission limits, assuming all particulate matter is $PM_{2.5}$, at 0.018 pounds per million British thermal units ("lb/MMBtu") firing natural gas and 0.0325 lb/MMBtu firing ULSD represents BACT.

Sulfuric Acid Mist

Emissions of sulfuric acid mist ("H_2SO_4") are generated by the oxidation of sulfur in the fuel. Most of the sulfur in any fuel burned in the combustion turbines is oxidized to SO_2. However small amounts of sulfite ("SO_3") are generated by the oxidation of the fuel sulfur in the

combustion turbine, the SCR catalyst, and the oxidation catalyst. The SO_3 can react with water in the flue gas to form H_2SO_4.

Exelon concluded that control of sulfuric acid mist emissions by using flue gas desulfurization was not technically feasible for the Project because of the back pressure a scrubber would impose on the combustion turbine exhaust.

H_2SO_4 emissions will be controlled by limiting the sulfur content of the fuel. Natural gas, the primary fuel, is naturally low in sulfur and ULSD is the lowest sulfur content fuel oil commercially available. The maximum sulfur content of the available (Spectra) pipeline natural gas is 0.92 grains per 100 cubic foot. The sulfur content of ULSD is limited to 0.0015%.

Exelon proposed the emission limits associated with using natural gas and limited ULSD use as BACT for sulfuric acid mist emissions. Upon review, MassDEP determined that an H_2SO_4 emission limit of 0.0024 lb/MMBtu firing natural gas and 0.0015 lb/MMBtu firing ULSD represents BACT.

Greenhouse Gas Emissions

Under the PSD regulations, GHG includes six compounds or chemical groups: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride ("SF_6"). Nitrous oxide emissions from uncontrolled and SCR controlled combustion turbines are inherently low. Hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride are not products of combustion and will not be emitted by the combustion turbines. Accordingly, PSD applicability is based on a CO_2 equivalent determined by multiplying each pollutant's mass emissions by its global warming potential. For the combustion turbines, the main constituent of GHG emissions is CO_2 at 696,867 tpy. Other GHG emissions at the Project are fugitive emissions from methane leaks at 23.0 tons CO_2e per year and fugitive emissions from SF_6 leaks at 6.27 tons CO_2e per year. The Project's potential GHG emissions are 697,049 tons CO_2e per year.

The combustion turbines do not emit sulfur hexafluoride. Exelon will comply with 310 CMR 7.72 Reducing Sulfur Hexafluoride Emissions from Gas-insulated Switchgear to reduce sulfur hexafluoride emissions from the electric switchgear that are part of the Project. Good combustion practices will control methane emissions. Exelon will minimize natural gas (methane) leaks by monitoring in accordance with manufacturer's recommendations and industry guidelines. Exelon will repair all leaks found during monitoring. The GHG BACT analysis focused on CO_2 emissions as the primary GHG component.

Step 1: Identify all control technologies

Exelon identified the following control technologies:

- Carbon Capture Sequestration ("CCS")
- Alternative electric generation technologies
- Energy efficiency (efficient CTG and energy utilization)
- Good combustion practices

Step 2: Eliminate technically infeasible options

There is insufficient space at the Facility to site a storage system for captured CO_2.CCS has not been demonstrated beyond pilot testing, site subsurface geology is not amenable to CO_2 sequestration; and there is no pipeline to transport GHG from the Project site to a known sequestration site. For these reasons, Exelon concluded that CCS is not technically feasible.

Other generation technologies are not technically feasible for the Project. For example, intermittent renewable sources such as solar and wind generation would not meet the objective of reliable quick-start generation for the ISO-NE system. (The Project is meant to be a "backstop" for when renewables are not available.) The generation, storage and use of stored energy, such as pumped storage hydroelectric, completely redefines the project, is not physically feasible at the site and has not been demonstrated at the scale needed to meet the Project's supply requirements.

Exelon examined using combined-cycle technology, which is more efficient than simple-cycle. They concluded that combined-cycle technology is not suitable for the Project's purpose: that is, starting quickly, providing full load within 10 minutes and to having the ability to operate over a wide range of loads.

Steps 3 and 4: **Rank/evaluate most effective feasible control technology**
The remaining control technologies are energy efficiency and good combustion practices. Exelon proposed to use both. Exelon selected GE LMS100, which is the most efficient simple-cycle combustion turbine available in its size range currently on the market. Exelon demonstrated that it would use good combustion practices such as state-of-the-art instrumentation and controls, and conduct periodic maintenance. Exelon will also use energy efficient systems at the Project, such as: efficient building heating and air conditioning, LED-based lighting fixtures, and Energy Star-rated appliances, to reduce parasitic load.

Step 5: Select BACT

Upon review, MassDEP determined that the emission limits associated with the installation and operation of the efficient simple-cycle GE LMS100 combustion turbines along with good combustion practices meets BACT for GHG. MassDEP determined BACT emission limits of 1,151 lb carbon dioxide equivalents per megawatt hour ("CO_2e/MWh") (gross) firing natural gas at full-load ISO conditions, and 1,551 lb/CO_2e/MWh (gross) firing ULSD at full-load ISO conditions. MassDEP also determined an annual average GHG BACT limit of 1,352 ("lb CO_2e/MWh") (gross), including periods of part-load operation and ULSD firing represents BACT. This limit will be complied with based on a 12-month rolling period calculated monthly.

Exelon identified one project (El Paso Electric Company, Montana Power Station) which had a lower CO_2 emissions rate on natural gas-only of 1,100 lb/MWh (gross). However, Exelon demonstrated that this limit is not achievable under the part-load operating conditions required by the Project and that the Montana Power Station utilizes wet cooling for the intercooler, which achieves a better heat rate than the air-cooled system proposed for the Project.

NOx Startup and Shutdown Emissions

NOx is the only PSD Pollutant with higher projected emissions during startup and shutdown than during the normal operation of the combustion turbines. Exelon proposed that BACT for startup and shutdown is the emission limit associated with using good operating practices (by following the combustion turbine manufacturer's recommendations during startup) and by limiting each startup to 30 minutes and each shutdown to 13 minutes. Additionally, operators will initiate ammonia injection as soon as the SCR catalyst system reaches its vendor-specified minimum operating temperature.

Based on the worst case scenario of highest emissions during cold starts, Exelon proposed startup emission limits of 22 pounds for each event firing natural gas and 39 pounds for each event firing ULSD. Exelon proposed shutdown emission limits of 6 pounds for each event firing natural gas and 7 pounds for each event firing ULSD. Exelon evaluated the PSD BACT determinations for NOx during startup and shutdown at simple-cycle electric generating facilities and found no currently operating facility with a more stringent NOx emission limit that applies in all startup and shutdown scenarios including cold starts. Upon review, MassDEP determined that Exelon's proposed startup and shutdown NOx emission limits represent BACT.

B. Emergency Generator and Emergency Fire Pump Engines

The Project includes an emergency generator engine and an emergency fire pump engine. Both engines will operate on ULSD fuel. The proposed emergency generator engine will be a 603

brake horsepower Caterpillar C-15 (or equivalent) ULSD-fired engine with a standby generating capacity of 450 kW. The emergency fire pump engine will be a 197 brake horsepower Clarke JU6H-UFAD (or equivalent) ULSD-fired engine. Both engines will be used in emergencies only (with the exception of periodic maintenance/testing events) and will be limited to a maximum of 300 hours per rolling 12-month period of operation unless MassDEP amends the regulation that is the basis of that requirement. The engines must meet the operation time limits of an amended regulation, if any. Each engine is also subject to the operating limitations specified in 40 CFR 60, Subpart IIII for emergency engines (including a 100-hour limit for non-emergency operation per calendar year.)

The BACT analysis for both engines included a fuel selection BACT analysis and a BACT analysis for NOx, PM, SO_2/Sulfuric Acid Mist, and GHG emissions.

Fuel Selection

The BACT analyses for the engines demonstrated that ULSD is the best fuel choice for the emergency engines due to the requirement for the engines to have a fuel supply that is directly available without interruption. While propane can be stored locally, the operator needs to evaporate the propane before firing in the emergency engines. Engines of the size proposed for the Project could need an external heat source to vaporize the propane fast enough to be used, especially in cold weather. Propane may therefore be unreliable in an emergency. Also, low pressure natural gas is not available at the Project site. National Fire Protection Association regulations restrict or prohibit the use of natural gas or propane instead of ULSD in the emergency fire pump engine.

ULSD is the fuel of choice due to its ability to be stored in a small tank adjacent to the engines. As such, Exelon proposed ULSD as the BACT fuel for the Project's emergency generator engine and emergency fire pump engine.

Upon review, MassDEP determined that ULSD is the best fuel choice for the Project's emergency engines. This has the effect of limiting emergency engine selection to compression ignition reciprocating internal combustion engines ("CI RICE").

NOx

With respect to NOx emissions from the emergency engines, Exelon identified two candidate technologies. These two technologies are selective catalytic reduction and the use of a low-NOx engine design. A low-NOx engine refers to an engine that complies with 40 CFR 89 Tier 3 engine standards (referenced by the NSPS for CI RICE at 40 CFR 60 Subpart IIII), or, for fire pump engines, an engine that complies with the applicable emission standards listed in Table 4

of 40 CFR 60 Subpart IIII. The BACT analysis concluded that both of these technologies are technically feasible, however the use of SCR on an emergency engine is highly unusual. An economic analysis for an SCR unit on the emergency engines found that the pollutant removal cost is not economically feasible. Exelon proposed the emission limits associated with the use of low-NOx engines as BACT.

Based on MassDEP review, new CI RICE- selection is constrained by the applicable federal emissions standards that apply to manufacturers under 40 CFR 60 Subpart IIII, or, for fire pump engines, an engine that complies with the applicable emission standards listed in Table 4 of 40 CFR 60 Subpart IIII. There is limited opportunity for owners to deviate from the standard offerings for either emergency or non-emergency stationary CI RICE, without jeopardizing the required manufacturer emissions certifications.

Therefore, MassDEP determined that NOx emissions limits imposed for the latest available model-year NSPS-compliant emergency stationary CI RICE represent BACT.

PM

Exelon identified two control technologies as available to control particulate emissions from the emergency engines. These two control technologies are an active diesel particulate filter ("DPF") and low-PM engine design. DPF was technically feasible, but the emission limits associated with using DPF was ruled out as BACT due to the excessive pollutant removal cost. A low PM engine design refers to an engine that complies with 40 CFR 89 Tier 3 engine standards (referenced by the NSPS for CI RICE at 40 CFR 60 Subpart IIII). The review of other RBLC precedents did not indicate the use of DPF for engines of this type. Exelon recommended the emission limits associated with the use of low-PM engine design as BACT.

MassDEP determined that PM emission limits imposed for the latest available model-year NSPS-compliant emergency stationary CI RICE represent BACT.

Sulfuric Acid Mist

Exelon identified the only control technology for control of sulfuric acid mist emissions from the emergency engines is the use of clean fuels. The use of clean fuels is technically feasible for emergency engines. An economic analysis of the cost effectiveness for emission control was not conducted for use of clean fuels. This is because the use of a clean fuel such as ULSD is already inherent to the project design and is unlikely to be economically infeasible. Exelon proposed the emission limits associated with the use of clean fuels as BACT for control of sulfuric acid mist emissions. Upon review, MassDEP determined that emissions limits reflecting the use of ULSD represent BACT for sulfuric acid mist emissions.

GHG

Exelon identified two potential control technologies for control of GHG emissions from the emergency engines: post-combustion controls and the use of clean fuels and good combustion control. The BACT analysis found post-combustion controls to be technically infeasible for engines of this size.

As stated above, MassDEP determined there is no readily available alternative fuel for an emergency stationary CI RICE with lower GHG emissions than ULSD. MassDEP determined that emission limits based on manufacturer specifications for the latest available model-year NSPS certified CI RICE and operation only during emergencies and for maintenance represents BACT for GHG.

Emergency Engine BACT Emission Limits

Upon review, MassDEP determined the specific emergency generator engine and emergency fire pump engine emission limits from 40 CFR 89 and listed in Table 2 below represent BACT.

Table 2

Pollutant	EPA Tier 3 Standard (g/kWh)	Emissions (lbs/hr)	Emissions (lb/MMBtu)	Emissions (tpy)[1]
Emergency Generator Engine BACT Emission Limits				
NOx and NMHC	4.0	3.98	0.85	0.60
$PM/PM_{10}/PM_{2.5}$	0.20	0.23	0.48	0.034
H_2SO_4	N/A	0.006	0.0012	0.0009
GHG, CO_2e	N/A	771	163.64	116
Emergency Fire Pump Engine BACT Emission Limits				
NOx and NMHC	4.0	1.6	1.04	0.24
$PM/PM_{10}/PM_{2.5}$	0.20	0.09	0.06	0.0133
H_2SO_4	N/A	0.002	0.0012	0.0003
GHG, CO_2e	N/A	247	163.64	37

Table 2 Key:

CO_2e = Carbon dioxide equivalents
g/kWh = grams per Kilowatt-hour
GHG = Greenhouse gases
lb/hr = pounds per hour
lb/MMBtu = pounds per million British thermal units
NOx = Nitrogen oxides
NMHC = Non-methane hydrocarbons
PM =Particulate matter
$PM_{2.5}$ = Particulate matter less than or equal to 2.5 microns in diameter

PM_{10} = Particulate matter less than or equal to 10 microns in diameter
H_2SO_4 = Sulfuric acid mist
tpy = tons per 12-month rolling period

Table 2 Notes:

1. Assumes 300 hours of operation per year.

VII. MONITORING AND TESTING

Exelon will install, calibrate, certify, maintain and continuously operate a continuous emission monitoring system (CEMS) for measuring emissions of NOx. The system will consist of a probe, analyzer and data acquisition system and will include a diluent monitor (O_2) and fuel flow monitors. The systems will comply with 40 CFR 60 Appendices B and F, all applicable portions of 40 CFR 72 and 75, 310 CMR 7.32, and 310 CMR 7.70.

Pursuant to 40 CFR 75.13 and 40 CFR 75 Appendix G, Exelon will also monitor CO_2 emissions. To obtain CO_2 mass emissions on an hourly basis, Exelon will use EPA methods contained in 40 CFR 75. Exelon will measure heat input on an hourly basis and moisture content to convert the measured ppmvd data to pounds per hour.

Exelon is required to monitor and keep records of the sulfur content of the natural gas and ULSD combusted in the combustion turbines pursuant to 40 CFR 60 Subpart KKKK.

Exelon is required to conduct stack tests for NOx, H_2SO_4 and total PM emissions within 180 days after initial firing of the combustion turbines to determine the compliance status with emission limits. Exelon is also required to repeat the initial compliance tests for PM and H_2SO_4 every five years.

VIII. AIR QUALITY IMPACT ANALYSIS

A. Introduction

Exelon is required to demonstrate, using air quality dispersion modeling, that the increase in emissions as a result of the Project, in conjunction with background air quality and other emissions, will not cause or contribute to a violation of any NAAQS or any applicable PSD increment. The EPA promulgated NAAQS for six air contaminants, known as criteria pollutants, for the protection of public health and welfare. The criteria pollutants are: nitrogen dioxide, sulfur dioxide, particulate matter, carbon monoxide, ozone and lead. The NAAQS include both

primary and secondary standards of different averaging periods. The primary standards protect public health and the secondary standards protect public welfare, such as damage to property or vegetation.

A PSD increment is the maximum allowable increase in ambient pollutant concentration above the applicable baseline air quality concentration for that pollutant and averaging period. PSD increments protect air quality in areas that meet the NAAQS for that pollutant.

Exelon conducted refined dispersion modeling analyses to predict the impacts of the Facility's emissions of PSD air pollutants on ambient concentrations, and determine whether the Project will comply with NAAQS and PSD Increments. Exelon conducted these analyses in accordance with EPA's "Guideline on Air Quality Models" (November 2005) as described in the Air Quality Modeling Protocol submitted to MassDEP on November 5, 2013 and revised March 2015. MassDEP approved the Modeling Protocol in March 2015. In response to an EPA comment on the 1-hour NO2 modeling, additional information was submitted on the Plume Volume Molar Ratio Method (PVMRM) inputs used in the model. Specifically, EPA requested technical justification for the use of non-default in-stack NO2/NOx ratios (ISRs) used for some of the existing sources in the cumulative modeling. EPA provided written approval for use of the non-default ISRs on December 7, 2016.

Exelon used the EPA-recommended AERMOD model (AERMOD version 14134, AERMAP version 11103 and AERMET version 14134) to perform the dispersion modeling. Exelon conducted dispersion modeling in a manner that evaluated emissions from a range of operating conditions in an effort to identify the worst case operating conditions, that is, those that result in the highest ambient impact for each pollutant and averaging period.

After review, MassDEP determined that Exelon conducted its dispersion modeling analyses according to the EPA Guidance and the Air Quality Modeling Protocol approved by MassDEP. EPA reaffirmed this during the public comment period and upon review of the additional information requested.

To conduct dispersion modeling, Exelon is required to input meteorological data relevant to the Project area. An applicant can either establish an on-site meteorological station to gather one year of data or propose to use five years of meteorological data from a source where the applicant believes data is representative of its proposed site.[9] Exelon used five years (2009 through 2013) of surface data collected by the National Weather Service ("NWS") from the Worcester Airport weather station in Worcester, Massachusetts and the corresponding upper air data from Albany, New York in the dispersion modeling. These stations are the closest first

[9] 40 CFR 51 Appendix W – Section 8.3.1.2

order NWS Stations and most representative of the Medway area. AERMET (version 14134), AERMINUTE (version 14237), and AERSURFACE (version 13016) were used to prepare the meteorological files. Exelon used default processing options in the AERMET processing for this analysis.

Exelon characterized land use within a 3 kilometer radius of the Facility as rural and therefore used rural dispersion coefficients in the dispersion modeling.

The modeling analyses included emissions from all proposed combustion equipment, that is; the two combustion turbines, the emergency generator engine, and the emergency fire pump engine, plus the existing combustion turbines, all operating simultaneously. Exelon determined emission rates at four combustion turbine operating loads (25, 50, 75, and 100 percent loads) each at four ambient operating temperatures (0°F, 30°F, 50°F and 100°F) at steady state conditions while firing natural gas and ULSD. Exelon also evaluated emissions from a combustion turbine startup/shutdown condition. The analysis used the particular operating scenario that resulted in the maximum impact for each particular pollutant and averaging period for subsequent analysis and comparison to Significant Impact Levels ("SILs") and NAAQS.

B. Significant Impact Analysis

The first part of the analysis was to predict which pollutants at which averaging times have more than a 'significant' impact on air quality. To identify new pollution sources with the potential to alter significantly ambient air quality, the EPA adopted "significant impact levels." If the predicted impact of the new or modified emission source is less than the SIL for a particular pollutant and averaging period, and the difference between background ambient air quality and the NAAQS is greater than the SIL, then no further evaluation is needed for that pollutant and averaging period. However, if the predicted impact of the new or modified source is equal to or greater than the SIL for a particular pollutant and averaging period, then further impact evaluation is required. This additional evaluation must include measured background levels of pollutants as well as emissions from both the proposed new or modified source and any existing emission sources that may interact with emissions from the proposed new emissions source (referred to as cumulative modeling).

C. Justification for Using Significant Impact Levels for $PM_{2.5}$

The PSD regulations addressing SILs for $PM_{2.5}$ were partially vacated and remanded in the January 22, 2013 decision of the US Court of Appeals for the DC Circuit (*Sierra Club v. EPA, 705 F.3d 458*). The use of the $PM_{2.5}$ SILs is still valid, however, in certain circumstances. The Appeals Court decision supporting the vacatur and remand involved cases in which the ambient

air quality background is very close to the NAAQS. This is not the case in the Medway area where the annual $PM_{2.5}$ background is about 70% of the NAAQS, 8.3 µg/m^3 vs. 12 µg/m^3, a difference that is more than 12 times greater than the remanded annual SIL value of 0.3 µg/m^3. Therefore, use of the vacated $PM_{2.5}$ SILs is appropriate in the case of the ambient air quality impact analysis for the Project because the background concentrations plus the SILs still leave a significant margin before the NAAQS would come close to being jeopardized.

Use of the prior $PM_{2.5}$ SILs is also consistent with the EPA guidance[10] on this matter, which states:

- The EPA does not interpret the Court's decision to preclude the use of SILs for $PM_{2.5}$ entirely but additional care should be taken by permitting authorities in how they apply those SILs so that the permitting record supports a conclusion that the source will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS.

- PSD permitting authorities have the discretion to select $PM_{2.5}$ SIL values if the permitting record provides sufficient justification for the SIL values that are used and the manner in which they are used to support a permitting decision.

- The $PM_{2.5}$ SIL values in the EPA's regulations may continue to be used in some circumstances if permitting authorities take care to consider background concentrations prior to using these SIL values in particular ways.

- Because of the Court's decision vacating the $PM_{2.5}$ [Significant Monitoring Concentration], all applicants for a federal PSD Permit should include ambient $PM_{2.5}$ monitoring data as part of the air quality impacts analysis. If the preconstruction monitoring data shows that the difference between the $PM_{2.5}$ NAAQS and the monitored $PM_{2.5}$ background concentrations in the area is greater than the EPA's $PM_{2.5}$ SIL value, then the EPA believes it would be sufficient in most cases for permitting authorities to conclude that a proposed source with a $PM_{2.5}$ impact below the $PM_{2.5}$ SIL value will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and to, therefore, forego a more comprehensive cumulative modeling analysis for $PM_{2.5}$.

- As part of a cumulative analysis, the applicant may continue to show that the proposed source does not contribute to an existing violation of the $PM_{2.5}$ NAAQS by demonstrating

[10] EPA, Office of Air Quality Planning and Standards, *Circuit Court Decision on $PM_{2.5}$ Significant Impact Levels and Significant Monitoring Concentration – Questions and Answers*, March 4, 2013. http://www.epa.gov/nsr/documents/20130304qa.pdf

that the proposed source's $PM_{2.5}$ impact does not significantly contribute to an existing violation of the $PM_{2.5}$ NAAQS. However, permitting authorities should consult with the EPA before using any of the SIL values in the EPA's regulations for this purpose (including the $PM_{2.5}$ SIL value in section 51.165(b)(2), which was not vacated by the Court).

Table 3 below presents the maximum predicted ambient air quality impact concentrations for the new emission sources at the Project. The analysis predicted that maximum ambient air quality impact concentrations from the Project are below SILs for all pollutants and averaging periods, except for the 1-hour NO_2, the 24-hour $PM_{2.5}$, and the 24-hour PM_{10} NAAQS. Therefore, Exelon needed to conduct a cumulative impact analysis with interactive sources[11] only for these pollutants and averaging periods. See Table 5 below for the results of that analysis.

Table 3

Results of Significant Impact Level Analysis

Criteria Pollutant	Averaging Period	Significant Impact Level ($\mu g/m^3$)	Maximum Predicted Project Impact (new sources only) ($\mu g/m^3$)	Less than the SIL?
NO_2	Annual[1] 1-hour[2]	1 7.5	0.3 **9.0**	Yes **No**
SO_2	Annual[1, 3] 24-hour[3, 4] 3-hour[4] 1-hour[5, 6]	1 5 25 7.8	0.04 0.7 1.5 1.4	Yes Yes Yes Yes
$PM_{2.5}$	Annual[7] 24-hour[8]	0.3 1.2	0.13 **6.4**	Yes **No**
PM_{10}	Annual 24-hour[9]	1 5	0.18 **9.3**	Yes **No**
CO	8-hour[4] 1-hour[4]	500 2,000	73.1 132.3	Yes Yes

Table 3 Key:

CO = Carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = Nitrogen dioxide
$PM_{2.5}$ = Particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = Particulate matter less than or equal to 10 microns in diameter
SIL = Significant Impact Level

[11] Interactive sources are permitted or existing emission sources that may have an impact on ambient air pollutant concentrations in the area of the Project.

SO_2 = Sulfur dioxide

Table 3 Notes:

1. Not to be exceeded.
2. Compliance based on 3 year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area. The 1-hour NO_2 standard was effective April 12, 2010.
3. The Environmental Protection Agency has revoked that the 24-hour and annual average primary standards for SO_2.
4. Not to be exceeded more than once per year.
5. Compliance based on 3 year average of 99th percentile of the daily maximum 1-hour average at each monitor within an area.
6. The 1-hour SO_2 standard was effective as of August 23, 2010.
7. Compliance based on 3 year average of weighted annual mean $PM_{2.5}$ concentrations at community oriented monitors.
8. Compliance based on 3 year average of 98th percentile of 24-hour concentrations at each population oriented monitor within an area.
9. Not to be exceeded more than once per year on average over 3 years.

D. Background Air Quality

An applicant must determine the background concentration of pollutants of concern to determine compliance with NAAQS. The PSD regulations require one year of preconstruction monitoring at the site of a proposed facility, but allow applicants to use three years of existing representative air quality monitoring data in lieu of preconstruction monitoring if the applicant can demonstrate that the ambient air impact of the proposed facility is less than a Significant Monitoring Concentration ("SMC") as specified in those regulations.

As shown in Table 4 below, dispersion modeling predicted maximum new source impact concentrations below corresponding SMC levels for all pollutants for which SMCs exist.

Table 4

Significant Monitoring Concentration Analysis

Pollutant	Averaging Period	SMC (µg/m^3)	Maximum Predicted Project Impact (µg/m^3)	Less than SMC?
NO_2	Annual	14	0.3	Yes
SO_2	24-hour	13	0.7	Yes

Table 4

Significant Monitoring Concentration Analysis

Pollutant	Averaging Period	SMC (µg/m^3)	Maximum Predicted Project Impact (µg/m^3)	Less than SMC?
PM_{10}	24-hour	10	9.3	Yes
CO	8-hour	575	73.1	Yes
Pb	3-month	0.1	0.004	Yes

Table 4 Key:

CO = Carbon monoxide
µg/m^3 = micrograms per cubic meter
NO_2 = Nitrogen dioxide
Pb = Lead
PM_{10} = Particulate matter less than or equal to 10 microns in diameter
SMC = Significant Monitoring Concentration
SO_2 = Sulfur dioxide

EPA had also established an SMC for $PM_{2.5}$ but it was vacated in the US Court of Appeals ruling mentioned above. On May 20, 2014, EPA issued guidance[12] to applicants and regulators with regard to the ramifications of the Appeals Court decision. The EPA guidance states, in part:

> The measured background levels incorporated into a cumulative analysis should be based on the preconstruction monitoring data gathered in accordance with the requirements of the EPA regulations 40 CFR 51.166(m)(1)(iii)-(iv); 40 CFR 52.21(m)(1)(iii)-(iv) (2). The EPA regulations contain an exemption from the preconstruction monitoring requirements in cases where ambient concentrations or the predicted impact of the source are less than the SMC [40 CFR 51.166(i)(5)(i) ; 40 CFR 52.21(i)(5)(i)]. In the decision mentioned above, a U.S. Court of Appeals vacated the SMC for $PM_{2.5}$. *Sierra Club v. EPA*, 705 F.3d 458. The court concluded that the $PM_{2.5}$ SMC provisions (51.166(i)(5)(i)(c) and 52.21(i)(5)(i)(c)) were inconsistent with the requirements of Section 165(e)(2) of the CAA. The EPA has subsequently removed the $PM_{2.5}$ SMC provisions from the regulation. Thus, permitting authorities may no longer rely on the SMCs for $PM_{2.5}$ to exempt permit applicants from compiling preconstruction monitoring data for $PM_{2.5}$ in accordance with Sections 51.166(m) and 52.21(m) of the EPA's regulation. However, the EPA believes PSD permit applicants may continue to meet the preconstruction monitoring requirements in these regulations by gathering for purposes of the permitting analysis data already available from existing

[12] EPA, Office of Air Quality Planning and Standards, *Guidance for $PM_{2.5}$ Permit Modeling*, May 2014. https://www.epa.gov/sites/production/files/2015-07/documents/pm25guid2.pdf.

monitors that are determined by the applicable permitting authority to be representative of background conditions in the affected area.

Exelon proposed using monitoring data from the Worcester Summer Street monitoring site, located approximately 20 miles to the west-northwest of the Project, for background air quality in lieu of preconstruction monitoring. Use of the data from this monitoring site is representative of air quality at the Project site and even conservative because Worcester is a more industrialized and more densely populated area than the Project site. The Project site is located in a suburban environment where there are fewer emission sources. One can expect air quality at the Project site to be somewhat better than at the Worcester Summer Street monitoring site.

The Summer Street monitoring site is located immediately adjacent to Interstate 290. Any potentially elevated ambient background pollutant concentrations due to mobile and stationary emission sources located in and around the Worcester metropolitan area that may be transported to the Project site by predominant winds from the west typically pass the Summer Street monitoring site and are therefore represented in the measurement data collected at the monitoring site.

In accordance with the PSD regulations and EPA guidance, MassDEP determined that the Worcester Summer Street monitoring site is representative of background conditions at the Project site for $PM_{2.5}$ and other PSD pollutants and that preconstruction monitoring is not required.

E. Cumulative Dispersion Modeling

Interactive Sources

Since dispersion modeling predicted maximum impact concentrations above SILs for the 1-hour NO_2, the 24-hour $PM_{2.5}$, and the 24-hour PM_{10} NAAQS, Exelon performed cumulative impact modeling for these pollutants and averaging periods with emissions from the new and existing sources at the Facility and interactive sources. Those impact concentrations were added to measured background levels and compared to the corresponding NAAQS. The interactive sources near the Project considered in the cumulative modeling were:

- ANP Bellingham (3.2 kilometers ("km") south of West Medway Station)
- Ardagh Glass, Inc., Milford (5.6 km west-southwest of West Medway Station)
- Bellingham Cogen (6.1 km west-southwest of West Medway Station)

- ANP Blackstone (10.4 km southwest of West Medway Station)
- Milford Power (5.4 km west-southwest of West Medway Station)

Table 5 shows the cumulative impacts with interactive sources at locations where the new source impact is above the SIL. The results of the cumulative impact analysis show that the Project's worst case emissions in combination with emissions from the existing onsite or interactive sources plus measured background levels did not result in concentrations that exceeded the applicable NAAQS.

Table 5

Cumulative Impacts of New and Existing Facility and Interactive Sources

Criteria Pollutant	Averaging Period	Cumulative Impact of Facility Plus Interactive Sources[1] ($\mu g/m^3$)	Background ($\mu g/m^3$)[2]	Total Impact Plus Background ($\mu g/m^3$)	Primary/Secondary NAAQS ($\mu g/m^3$)	Less than Primary/ Secondary NAAQS?
NO_2	1-hour	80.8[3]	47.8	128.6	188/None	Yes/NA
$PM_{2.5}$	24-hour	2.5	20.7	23.2	35/35	Yes/Yes
PM_{10}	24-hour	6.5	40.0	46.5	150/150	Yes/Yes

Table 5 Key:

EPA = Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
NA = Not applicable
NAAQS = National Ambient Air Quality Standards
NO_2 = Nitrogen dioxide
$PM_{2.5}$ = Particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = Particulate matter less than or equal to 10 microns in diameter

Table 5 Notes:

1. Consistent with EPA modeling guidance for NAAQS compliance assessments, impact concentrations are based on:
   - for NO_2 - the 5 year average of the 8^{th} highest daily maximum concentrations occurring in each year,
   - for $PM_{2.5}$ - the 5 year average of the 8^{th} highest 24-hour average values occurring in each year, and.
   - for PM_{10} - the highest 6^{th} high 24-hour average value over 5 years.
2. Background concentrations are based on the measured values from 2011 through 2013. Short term background concentrations for 24-hour $PM_{2.5}$ and 1-hour NO_2, are the average of the 98^{th} percentile values over the 3 years (2011-2013). These assumptions are consistent with the definition of the NAAQS for the pollutant.

3. The modeled cumulative NO_2 impacts represent an EPA-approved "Tier 3" approach reflecting the use of the Plume Volume Molar Ratio Method for the conversion of NOx emissions to NO_2 in the ambient air. This modeling guidance is contained in USEPA's Clarification Memo, dated March 1, 2011, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard". The use of a "Tier 3" method requires justification and approval from the appropriate regulatory agencies. Exelon justified its use in a modeling protocol submitted to and approved by MassDEP in March 2015.

F. Increment Impact Analysis

A PSD increment is the maximum allowable increase in ambient pollutant concentration above the applicable baseline air quality concentration for pollutants and averaging periods that have increment thresholds. PSD increments protect air quality in areas that meet the NAAQS for that pollutant.

On October 20, 2010, EPA published an increment standard for $PM_{2.5}$, averaged over both an annual and a 24-hour basis. In this rulemaking, EPA established the trigger date of October 20, 2011. All PSD emission sources permitted after the trigger date are required to demonstrate that their $PM_{2.5}$ emissions will not consume more than the available increment. Because Exelon is the first PSD application in Norfolk County after October 20, 2011, it triggers the minor source baseline date when MassDEP deems Exelon's PSD application to be complete.

According to current EPA guidance,[13] compliance with the PSD Increments is demonstrated for all pollutants and averaging periods for which impacts are below the SILs. This includes compliance for $PM_{2.5}$ for new or modified facilities representing the first PSD application in an area that establishes the minor source baseline date for that area. MassDEP tracks $PM_{2.5}$ increment a county-wide basis. The Project is a major modification that is establishing the $PM_{2.5}$ minor source baseline date for Norfolk County. The Project's modeled $PM_{2.5}$ emissions are above the SIL, as a result, the Project's emissions need to be considered in a $PM_{2.5}$ increment analysis. However, because the Project is establishing the baseline date, Exelon need not include emissions from any interactive sources in the increment analysis.

MassDEP tracks the PM_{10} increment a town by town basis. The minor source baseline date was triggered in the Town of Medway in the year 2000. As a result, the interactive sources mentioned above, which came into existence in or after 2000, need to be included in the PM_{10} increment analysis.

[13] EPA memorandum from Tyler Fox to Proposed Regulatory Docket No. EPA-HQ-OAR-2015-0310 dated June 30, 2015, Page 6. See: https://www3.epa.gov/ttn/scram/11thmodconf/20150630-Ozone_Docket_Memo.pdf

Exelon performed increment modeling for 24-hour $PM_{2.5}$ and PM_{10}. There is no increment for 1-hour NO_2. As shown in Table 6 below, dispersion modeling predicted resultant impacts that were below increments for both pollutants.

Table 6
Increment Impact Analysis

Pollutant	Averaging Period	Increment (µg/m^3)	Modeled Impact (µg/m^3)	Does Impact Meet Increment?
$PM_{2.5}$	24-hour	9	8.68	Yes
PM_{10}	24-hour	30	8.82	Yes

Table 6 Key:

$PM_{2.5}$ = Particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = Particulate matter less than or equal to 10 microns in diameter
µg/m^3 = micrograms per cubic meter

G. Secondary $PM_{2.5}$ Impacts

EPA's *Guidance for $PM_{2.5}$ Permit Modeling* provides guidance on demonstrating compliance with the NAAQS and PSD increments for $PM_{2.5}$, specifically with regard to considerations of the secondarily formed $PM_{2.5}$. In the Guidance, EPA defines four Assessment Case categories based on a project's potential emissions of direct $PM_{2.5}$ and precursors for potential secondary $PM_{2.5}$ formation, NOx and SO_2 (in tons per year). The Assessment Case categories identify assessment approaches that are available and appropriate for each case. The Project falls into Case 3 because direct $PM_{2.5}$ emissions are greater than 10 tpy and NOx and/or SO2 emissions are greater than 40 tpy. Accordingly, Exelon conducted a Case 3 qualitative assessment of potential secondary formation of $PM_{2.5}$, which is appropriate because the underlying refined air quality modeling provides a well-developed analysis of both the current background concentrations and the Project's primary $PM_{2.5}$ emissions. Exelon's qualitative assessment followed the example in Appendix D of the Guidance, which involves calculating an equivalent secondary $PM_{2.5}$ to primary $PM_{2.5}$ ratio. The ratio is 1.01 based on projected $PM_{2.5}$, NOx and SO_2 emissions. This assessment determined that the secondary $PM_{2.5}$ impact associated with the Project's precursor emissions will not cause or contribute to a violation of the 24-hour or annual $PM_{2.5}$ NAAQS. See Table 7 below.

In addition to demonstrating compliance with the NAAQS, Exelon is required to demonstrate that the impact of its primary plus secondary emissions will not exceed available PSD increment.

See Table 7 below for the comparison of the Project's primary plus secondary $PM_{2.5}$ emissions to both the NAAQS and PSD increments.

Table 7

Total $PM_{2.5}$ (Primary + Secondary) Impacts Comparison To The NAAQS And PSD Increments

Avg. Period	New Source Modeled Primary $PM_{2.5}$ Conc. ($\mu g/m^3$)	Equivalent Ratio	Primary plus Secondary $PM_{2.5}$ Conc. ($\mu g/m^3$)	Monitored Background ($\mu g/m^3$)	Existing Source Contrib. ($\mu g/m^3$)	Total PM2.5 Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Does Impact Meet the NAAQS and PSD Increment?
NAAQS								
24-Hour	6.36	1.01	6.42	20.7	0.415[1]	27.5	35	Yes
PSD Increment								
24-Hour	8.68	1.01	8.77	N/A	N/A	8.77	9	Yes

Table 7 Key:

NAAQS = National Ambient Air Quality Standards
$\mu g/m^3$ = micrograms per cubic meter
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter
% = percent
PSD = Prevention of Significant Deterioration

Table 7 Notes:

1. Includes existing West Medway emission units and interactive sources

H. Impairment to Visibility, Soils and Vegetation and Impact on Growth

Exelon is required by 40 CFR 52.21(o) to conduct an analysis of the air quality impact and impairment to visibility, soils, and vegetation that would occur as a result of the Project and general commercial, residential, industrial, and other growth associated with the Project.

Visibility

The Lye Brook Wilderness Area in southern Vermont is the closest Class I area to the West Medway Station. Lye Brook is located approximately 165 km to the northwest of West Medway Station. As part of the Regional Haze Regulations, EPA has devised a screening criterion for emission sources located more than 50 km from the Class I area. A source is considered to have

negligible impacts when the combined annual emissions of SO_2, NOx, PM_{10}, and H_2SO_4 (in tons) divided by the distance (in km) from the Class I area is 10 or less. In this case, this ratio is approximately 1.7 (273 tons/165 km). Therefore, Exelon expects the Project to have negligible visibility impacts with respect to the Lye Brook Wilderness Area, and no further Class I visibility impact analyses are required.

To confirm this result, Exelon conducted a visibility analysis of the Project using the EPA VISCREEN program (Version 1.01 dated 88341). The VISCREEN modeling demonstrates that the addition of the new combustion turbines, emergency generator engine and the emergency fire pump engine associated with the Project will comply with the criteria established in the *Workbook for Plume Visual Impact Screening and Analysis (Revised)* (EPA 1992) for maximum visual impacts inside the Lye Brook Wilderness Area. The projected plume visual impacts do not exceed the screening criteria. See Table 8 below.

Table 8

Class I Visibility Modeling Results - Maximum Visual Impacts Inside the Class I Area

					Delta-E		Absolute Contrast	
Background	**Theta (°)**	**Azimuth (°)**	**Distance (km)**	**Alpha (°)**	**Screening Criteria**	**Plume**	**Screening Criteria**	**Plume**
SKY	10	84	165.1	84	2.00	0.567	0.05	0.010
SKY	140	84	165.1	84	2.00	0.109	0.05	-0.004
TERRAIN	10	84	165.1	84	2.00	0.504	0.05	0.005
TERRAIN	140	84	165.1	84	2.00	0.060	0.05	0.001

Table 8 Key:

° = degrees
km = kilometers

Soils and Vegetation

PSD regulations require analysis of air quality impacts on vegetation with significant commercial or recreational value, and on soils. Evaluation of impacts on vegetation is made by comparing the predicted Project impacts with the screening levels presented in *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals* (EPA, 1980).

For the PSD pollutants under review, the designated vegetation screening levels are equivalent to or exceed NAAQS and/or PSD increments, so compliance with NAAQS and PSD increments assures compliance with sensitive vegetation screening levels.

Impact on Growth

Constructing the new installation will require up to 300 workers. Four to 6 new full time employees will be required when the Project is operating. Exelon expects a significant construction work force is available in the region. Therefore, this region can provide the work force to support the Project's construction.

If any new personnel move to the area to support the Project, a significant housing market is already established and available. Therefore, no new housing is expected. Further, because only a few new employees would need to move into the area to support the Project and there is a significant level of existing commercial activity in the area, Exelon does not foresee the need for new commercial construction to be necessary to support the Project's work force.

No significant level of industrial related support will be necessary for the Project, thus industrial growth is not expected.

MassDEP does not expect any new significant emissions from secondary growth during either the construction phase or operations.

IX. MASS BASED EMISSION LIMITS

To ensure that Exelon does not violate NAAQS and PSD increments during operation of the Project, a PSD Permit must contain enforceable permit terms and conditions to ensure that the Project does not exceed the mass flow rates for each modeled pollutant. MassDEP established mass-based emission limits for each PSD pollutant in the PSD Permit. Stack tests will document the compliance status of NOx, particulate matter and sulfuric acid mist with the mass-based emission limits. Exelon will install CEMS for NOx and will document compliance of NOx emission limits on a 1-hour basis. Exelon will also monitor other combustion parameters to indicate compliance with particulate matter and sulfuric acid mist emission limits. Exelon will determine compliance with the annual CO_2 emission limit by calculating CO_2 emissions using the procedures in 40 CFR 98.

X. ENVIRONMENTAL JUSTICE

The Massachusetts Executive Office of Energy and Environmental Affairs ("EOEEA") Geographic Information System includes environmental justice areas divided by block groups based on the 2010 US Census data. Based on environmental justice mapping completed by EOEEA and EPA, Exelon determined the Project does not abut any EJ areas and is not located within 1 mile of any EJ areas. However, the Project is within approximately five miles of a number of environmental justice communities in the Towns of Milford and Franklin.[14] The closest EJ areas are located approximately 3 miles to the west of the Project.

As mentioned above, MassDEP administers the PSD Program in accordance with the provisions of the April 11, 2011 PSD Delegation Agreement between MassDEP and EPA which states that MassDEP agrees to implement and enforce the federal PSD regulations in 40 CFR 52.21.[15] The terms of the PSD Delegation Agreement require MassDEP to demonstrate that the PSD permit does not violate EPA's Environmental Justice (EJ) policy and guidelines. The Delegation agreement explicitly says:

> MassDEP will follow EPA policy, guidance, and determinations as applicable for implementing the federal PSD program, whether issued before or after the execution of this Delegation Agreement, including…Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Exec. Order 12,898, 59 Fed. Reg. 7,629 (Feb. 16, 1994). ("Executive Order" or "EJ 12898")[16].

EJ 12898 states in relevant part that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on

[14] Title VI of the Civil Rights Act of 1964 requires state agencies that receive federal financial assistance to comply with EPA's Title VI requirements. In order to comply with this requirement, EOEEA adopted the 2002 Environmental Justice Policy that requires certain projects the meet specific MEPA thresholds and proximity to EJ areas to perform enhanced public participation, and/or enhanced analysis of environmental impacts. In section 8 of the final Air Quality Plan Approval, MassDEP describes how MassDEP complied with the enhanced public participation requirements, and how there will be no disproportional adverse health or environmental impacts from the Project to any EJ communities.

[15] Section III. Scope of Delegation, Section A., states, "Pursuant to 40 CFR 52.21(u), EPA hereby delegates to MassDEP full responsibility for implementing and enforcing the federal PSD regulations for all sources located in the Commonwealth of Massachusetts, subject to the terms and conditions of this Delegation Agreement."

[16] https://ceq.doe.gov/nepa/regs/eos/ii-5.pdf

minority populations and low- income populations. Exec. Order 12898, § 1-101, 59 Fed. Reg. 7, 629 (Feb. 16, 1994).

Federal agencies are required to implement this order consistent with, and to the extent permitted by, existing law. To comply with this requirement, EPA adopted its Environmental Justice Policy that describes environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Meaningful involvement means:

- People have an opportunity to participate in decisions about activities that may affect their environment and/or health
- The public's contribution can influence the regulatory agency's decision
- Community concerns will be considered in the decision making process
- Decision makers will seek out and facilitate the involvement of those potentially affected.

MassDEP understands that the Executive Order and EJ Policy requirements pertain to MassDEP as EPA's delegated permitting authority with respect to the PSD review process for the Project.

Based on its review of the PSD application, MassDEP analysis of environmental justice issues determined that MassDEP has complied with the Executive Order and EJ Policy because it conducted enhanced public participation and the Project's emissions will not have a disproportionally high and adverse human health or environmental effects on minority and low income populations. Furthermore, MassDEP has found no indication that the Project will not extend fair treatment and meaningful involvement to all people regardless of race, color, national origin, or income with respect to the preconstruction environmental review process for the project.

As demonstrated in Exelon's Application, and as further set forth below, no EJ communities will bear a disproportionate share of negative health or environmental consequences from the issuance of a PSD Permit to the Project as (1) the Project will not be located in or abutting an EJ area; (2) nearby EJ communities have been provided with several opportunities to participate in the permitting process; and (3) the Project meets all applicable air emissions standards and would not cause or contribute to a violation of the health-based National Ambient Air Quality Standards. Moreover, Exelon's application states that the Project will

enhance the region's overall electric system and support the future of renewable energy in Massachusetts by providing a quick-starting back-up for intermittent renewable energy sources such as solar and wind. This will benefit all communities, including EJ areas.

A. Enhanced Public Participation

As part of compliance with the EJ Policy, EPA adopted regulations at 71 F.R. 14,207, 14,210 (2006) that provide agencies guidance on how to conduct enhanced public participation. This regulation includes suggestions for translating of notices into the language(s) of the EJ Community, providing sufficient public notice through multiple media, and locations and establishing depositories of information in the community.[17]

MassDEP published the Notice of Public Hearing and Public Comment Period on the Proposed Air Quality Plan Approval in English, Spanish, and Portuguese. The Notice indicated that MassDEP would provide a translator at the Public Hearing and copies of documents in the public record in Spanish and Portuguese, if requested. On October 12, 2016, MassDEP issued a Proposed Air Quality Plan Approval, a Draft PSD Permit and a PSD Fact Sheet for this Application. MassDEP held a public hearing on the proposed actions on November 15, 2016 at 7:00 PM at Medway Middle School Auditorium in Medway, Massachusetts. The public comment period ended November 23, 2016.

In addition to extensive public participation on the PSD Permit, following is a summary of recently conducted public outreach throughout the regulatory process for the Project, including outreach to environmental justice communities.

Stakeholder Outreach

Project representatives have attended a number of open Selectmen and other Town Board meetings in Medway and Millis during the fall and early winter of 2015. The Project has continued to update its website[18] and has provided updates on social media, including Facebook[19] and Twitter.[20] The Town of Medway complemented Exelon's communications efforts with its own outreach and communications programs. The Town of Medway retained a team of attorneys, engineers, and environmental consultants to conduct an independent review of the Project. The team completed its review and reported their findings at a well-attended public

[17] *Id*. p. 14214-14215.
[18] See: http://www.medwayenergy.com/
[19] See: https://www.facebook.com/Medway-Clean-Energy-Expansion-1627579820839604/?fref=nf
[20] See: https://twitter.com/ExelonGen?lang=en

forum on October 21, 2015. The Town's review team responded to residents' questions during the forum. Lastly, the Town of Medway website also contains a section devoted to the Exelon Project.[21]

Massachusetts Environmental Policy Act

Exelon provided the Environmental Notification Form in alternative information repositories and published the public notice in Spanish and Portuguese in the Milford Daily News. The Draft Environmental Impact Report ("DEIR") and Final Environmental Impact Report ("FEIR") were available at public libraries in Medway, Millis, Bellingham, Milford and Franklin, and are available to the public upon request through the Environmental Monitor or the Project website. In addition to the Monitor, the Milford Daily News published a notice on the filing of the DEIR (including Spanish and Portuguese translations) and the FEIR. Exelon also provided DEIR Notices for posting at two Milford churches with Portuguese and Spanish speaking congregants. The Town of Medway's website included information on the Project. In addition to the initial distribution list, Exelon provided copies of the DEIR and FEIR (paper or electronic) upon request during the comment periods.

Energy Facility Siting Board

At the direction of the Energy Facilities Siting Board ("EFSB"), Exelon published the Notice of Public Hearing/Notice of Adjudication ("Notice") for this proceeding in English in the Boston Globe and the Milford Daily News, and in Spanish in El Mundo on May 21, 2015, May 28, 2015, and June 4, 2015. In compliance with the directives of the EFSB, Exelon provided copies of the Petition to the Medway Town Clerk and the Medway Public Library. For the EFSB public hearing process, community newspapers published translated Notices and interpreter services were provided at the hearing. Moreover, as required by the EFSB, Exelon produced versions of the Notice in three languages – English, Spanish and Portuguese – and mailed the Notice to all property owners within 300 feet of the 94-acre Summer Street property. Exelon posted the Notice in all three languages at the Medway Town Clerk office, and sent the Notice to the Medway Planning Board and to the Planning Board of each abutting municipality. On June 11, 2015, the Siting Board conducted a public comment hearing regarding Exelon's Petition to construct and Amended Zoning Exemption Petition. The hearing was held at the Medway Middle School, 45 Holliston Street, Medway.

[21] See: http://www.townofmedway.org/Pages/MedwayMA_Bcomm/BOS/exelonbulletin

B. Assessment of the Project's Impact on Public Health and the Environment

In the context of an environmental justice analysis, compliance with the NAAQS is emblematic of achieving a level of public health protection that, based on the level of protection afforded by a primary NAAQS, demonstrates that minority or low- income populations will not experience disproportionately high and adverse human health or environmental effects due to exposure to relevant criteria pollutants.[22]

To identify whether new pollution sources may significantly adversely affect ambient air quality, the EPA has adopted "significant impact levels" ("SILs") for the criteria pollutants except ozone and lead. The SIL is a threshold value that in PSD permitting is used for modeling screening purposes: impacts below the SIL are not significant. If the predicted impact of the new or modified emission source is less than the SIL for a particular pollutant and averaging period, and the margin between background ambient air quality and the NAAQS itself is no less than the SIL, then no further evaluation is needed for that pollutant and averaging period. However, if the predicted impact of the new or modified source is equal to or greater than the SIL for a particular pollutant and averaging period, then further impact evaluation is required. This additional evaluation must include measured background levels of pollutants, and emissions from both the proposed new or modified source and any existing emission sources that may interact with emissions from the proposed new emissions source (referred to as cumulative modeling). It is important to emphasize that modeled impacts above the SIL do not necessarily mean a project's emissions would be unhealthy, or would have an adverse effect on a population. To the contrary, the SIL is typical set at a very small percentage of the NAAQS. Thus modeled impacts that exceed the SIL, but are below the NAAQS, do not present health risks.

For a PSD permit, compliance with the NAAQS is sufficient to demonstrate that emissions of a PSD-regulated pollutant from a proposed facility will not have disproportionately high and adverse human health or environmental effects on a minority or low- income population. This is because the Executive Order concerns itself with effects that are adverse, and air emissions that do not cause an exceedance of the NAAQS do not lead to an adverse impact cognizable under the PSD permit program. 401, 16-17 (EAB 2000); In re Sutter Power Plant, 8 E.A.D. 680, 692 (EAB 1999) (describing the NAAQS as the bellwether of health protection).

EPA sets the NAAQS using technical and scientific expertise, ensuring that the NAAQS protects the public health with an adequate margin of safety. See CAA §109(b), 42 U.S.C. § 7409(b). Moreover, in determining the NAAQS, EPA considers the impact of the pollutant on sensitive

[22] In re Shell Gulf of Mexico, Inc., OCS Appeal Nos. 10-01 through 10-04 (hereafter ― Shell II), slip op. at 74 (EAB Dec. 30, 2010); see also In re Shell Offshore Inc., 13 E.A.D. 357, 404-05 (2007); In re Knauf Fiber Glass, GmbH, 9 E.A.D.

subpopulations, such as children, the elderly, and asthmatics.[23] Thus, compliance with the NAAQS by any margin means that public health, including that of sensitive subpopulations, will be protected with an adequate margin of safety from the effects of the particular criteria pollutant under review.

Exelon's Air Quality Impact Analysis

As discussed in Section VIII above, Exelon conducted refined dispersion modeling analyses to assess the impact of the Facility's emission of criteria air pollutants against NAAQS and PSD Increments.

The modeling analyses included emissions from all proposed combustion equipment, that is; the two combustion turbines, the emergency generator engine, and the emergency fire pump engine, plus the existing combustion turbines, all operating simultaneously. The analysis used the worst case (most conservative or greatest-predicted-impact case) of the 32 sets of steady state results for each pollutant and averaging period for subsequent analysis and comparison to SILs and NAAQS.

Project's Compliance with Significant Impact Levels

The first analysis in the Application was to predict which pollutants at which averaging times have more than a 'significant' impact on air quality. As explained in Table 6 in Section VIII above, the analysis predicted that maximum ambient air quality impact concentrations from new sources at the Project are below SILs for all pollutants and averaging periods, except for the 1-hour NO_2, the 24-hour PM_{10}, and the 24-hour $PM_{2.5}$ standards.

Project's Compliance with NAAQS

After evaluating whether the emissions were below the SILs, MassDEP evaluated whether the emissions effect on ambient air quality would cause the ambient air concentrations to reach the NAAQS. For all pollutants and operational scenarios, the project impacts plus background are below the NAAQS, which are considered protective of the health of sensitive populations such as asthmatics, children and the elderly. In addition, the total ambient air concentrations (including modeled impacts from all of the West Medway sources – existing and new sources – plus modeled impacts from other significant emitters within 10 km of the Facility, plus ambient monitored values) demonstrate that there is no predicted NAAQS violation within any environmental justice areas within five miles of the Facility. Exelon has also submitted a Human

[23] Shell II, slip op. at 64 n.72; see also Coalition of Battery Recyclers Ass'n v. EPA, 604 F.3d 613, 617-18 (D.C. Cir. 2010); Lead Indus. Ass'n v. EPA, 647 F.2d 1130, 1152-53 (D.C.Cir.1980).

Health Risk Assessment concluding that the Project will not contribute to any significant health risks among potentially affected populations, both within and outside environmental justice areas.[24] MassDEP concurs with this finding.

Moreover, as part of its air quality modeling analysis, Exelon investigated whether the air quality impacts from the Project would be disproportionately high in the environmental justice areas when compared to areas not classified as environmental justice areas. Exelon computed a population weighted average concentration for pollutants and at averaging times above the Significant Impact Levels (NO_2, PM_{10}, and $PM_{2.5}$) using the worst case modeled impacts from the new sources for each averaging period. Exelon calculated the population weighted concentrations for areas classified as environmental justice areas and compared that to the population weighted concentrations in areas not classified as environmental justice areas within 5 miles of the Facility. Based on the results, Exelon concluded that the air quality impacts from the Project are not disproportionately higher in the environmental justice areas when compared to areas not classified as Environmental Justice areas. MassDEP has reviewed Exelon's demonstration and agrees that the air quality impacts from the Project will not have a disproportionally higher adverse impact on environmental justice areas compared to non-environmental justice areas.

Cumulative Dispersion Modeling

Exelon used dispersion modeling to predict the air quality impacts from the entire Facility, including the six existing emission units and all proposed new units. Exelon added these impacts to background air quality. Table 7 in Section VIII above shows the cumulative ambient air concentrations including impacts of both the new and existing sources at the West Medway Facility when added to background air quality. The results of the cumulative Facility impact analysis show that the Project's worst case emissions from the proposed new sources in combination with emissions from the existing Facility sources did not result in concentrations that exceeded the applicable NAAQS when added to background.

Since dispersion modeling predicted maximum impact concentrations above SILs for 1-hour NO_2, 24-hour PM_{10}, and 24-hour $PM_{2.5}$, cumulative impact modeling was performed for these pollutants and averaging periods with emissions from the new and existing emissions sources at the facility, existing interactive sources and measured background levels to compare against the

[24] http://www.medwayenergy.com/wp-content/uploads/2015/10/human_health-_risk_assessment_west_medway_ii_091015.pdf

corresponding NAAQS. The existing interactive sources in Massachusetts nearby the Facility considered in the cumulative modeling were:

- ANP Bellingham (3.2 km south of West Medway Station)
- Ardagh Glass, Inc., Milford (5.6 km west-southwest of West Medway Station)
- Bellingham Cogen (6.1 km west-southwest of West Medway Station)
- ANP Blackstone (10.4 km southwest of West Medway Station)
- Milford Power (5.4 km west-southwest of West Medway Station)

Table 8 in Section VIII above, shows the cumulative impacts with offsite existing sources at locations where the new source impact is above the SIL. The results of the cumulative impact analysis show that under no condition did the Project's worst case emissions in combination with emissions from the existing onsite or offsite interactive sources plus measured background levels result in or modeled ambient air concentrations that exceeded the applicable NAAQS.

Analysis of Secondary $PM_{2.5}$ Impacts

Exelon conducted a Case 3 qualitative assessment of potential secondary formation of $PM_{2.5}$, which is appropriate because the underlying refined air quality modeling provides a well-developed analysis of both the current background concentrations and the Project's primary $PM_{2.5}$ emissions. This assessment determined that the secondary $PM_{2.5}$ impact associated with the Project's precursor emissions will not cause or contribute to a violation of the 24-hour or annual $PM_{2.5}$ NAAQS. See Table 7 in Section VIII above.

Health Risk Assessment

Exelon commissioned a health risk assessment (HRA) to assess the potential for human health risk associated with the Project. [25] Gradient Corporation prepared the human health risk assessment evaluating the likelihood of both acute non-cancer health risks and chronic non-cancer and cancer health risks that may result from people's inhalation of airborne pollutants for Project stack air emissions. Gradient also collected relevant background health information for Medway and surrounding communities to determine if any types of disease (e.g., cancer and asthma) were higher than expected compared to Massachusetts as a whole.

[25] Gradient Corporation, "Updated Health Risk Assessment (HRA) for Exelon's Proposed West Medway Project", September 10, 2015 (Appendix F of the PSD Application).

The HRA indicates that maximum modeled air concentrations associated with Project air emissions would not be expected to contribute to significant health risks among potentially affected populations. Several separate lines of evidence from the HRA support the conclusion that the potential air emissions from the Project are not expected to create public health risks in the Medway area. These include the following:

The maximum cumulative air concentrations (project impact plus existing background) of the criteria pollutants of concern, which include SO_2, CO, NO_2, and PM, are well below the health-protective NAAQS. NAAQS are set to protect human health with a wide margin of safety even for sensitive populations. Stack emissions of criteria air pollutants are thus not expected to lead to impacts on human health (e.g., asthma, cardiovascular and respiratory diseases) in nearby communities, even in sensitive populations.

For possible non-cancer effects, all hazard quotients (HQs) calculated for an offsite resident exposed to maximum modeled incremental Project stack air toxics impacts are well below unity (HQ = 1),19 with none being higher than HQ = 0.023. The overall summed hazard index (HI) for Project stack air toxics emissions, which makes the health-protective assumption that all chemicals act via the same toxic-effect pathway, is also well below 1.0 (HI = 0.04). These results help assure that non-cancer health effects from chronic exposures are not to be expected from Project stack air toxics emissions.

Conservatively projected lifetime cancer risks for maximum modeled incremental Project stack air toxics impacts are well below the 1 in 1,000,000 to 1 in 10,000 lifetime risk range considered to be acceptable by US EPA. The overall summed cancer risk is about 8 in 100,000,000, which is well below US EPA's de minimis 1-in-1,000,000 risk. The individual pollutant cancer risks are each even lower than the acceptable range, between about 1 in 10,000,000,000 to about 3 in 100,000,000. These results support an absence of any significant cancer risk from worst-case chronic exposures to maximum modeled Project stack air impacts.

Conservatively projected cancer risks for maximum modeled Project stack impacts of possible carcinogenic chemicals were well below the 1 in 10,000 to 1 in 1,000,000 lifetime risk range, which is considered to be acceptably low by EPA. The overall summed cancer risk from the Project was about 1 in 10,000,000 over a lifetime, which is well below the EPA de minimis risk level. The individual pollutant cancer risks were each even lower than the de minimis level, between about 1 in 10,000,000,000 and about 4 in 100,000,000.

Overall, there is no expectation that operation of Exelon's Proposed West Medway Project will affect asthma prevalence or hospitalizations among either schoolchildren or adults. This conclusion is supported by the results of our public health evaluation of criteria air pollutants

from Project stack emissions, the assessment of chronic inhalation non-cancer and cancer health risks from Project air toxics stack emissions, and the acute (short-term) exposure evaluation for respiratory irritants, all of which support the negligible impacts of Project stack air emissions to both local air quality and potential health risks. In particular, maximum modeled Project 1-hour concentrations of several respiratory irritants (NO_2, SO_2, acetaldehyde, acrolein, formaldehyde) were shown to be far below health-based acute reference values that are developed to be protective of sensitive subpopulations including asthmatics.

Additionally, community health data for Medway and nearby communities confirms that the Medway area has overall similar rates of asthma, cardiovascular, and cancer rates compared with the state as a whole. In combination with the results of the HRA, therefore it can be concluded that air emissions from operation of the proposed Project are not expected to significantly alter any of these baseline health statistics.

C. Conclusion

The proposed Project is not located in or adjacent to an EJ area. The proposed Project is located within about 3 miles of EJ areas. MassDEP met EPA's EJ public participation requirements (by translating of notices into the languages of the EJ Community, providing sufficient public notice through multiple media, and locations and establishing depositories of information in the community) and has demonstrated the Project's modeled air quality impact will not result in exceedance of the NAAQS – which are designed to be protective of sensitive populations – for any PSD pollutant. Further, Exelon has conducted a detailed human health effects study which demonstrates that there are no adverse impacts on any populations, including sensitive populations, as a result of the proposed Project and therefore there are no disproportionate adverse impacts on EJ communities. Accordingly, MassDEP concludes that there is no disproportionately high and adverse human health or environmental impacts on any EJ communities as a result of the proposed Project.

The above-discussed analyses and actions fulfill MassDEP's obligations under the Delegation Agreement and fulfill all obligations under Executive Order 12898 and EPA Environmental Justice Policy.

XI. NATIONAL HISTORIC PRESERVATION ACT, ENDANGERED SPECIES ACT, TRIBAL AND OTHER CONSULTATIONS

MassDEP received a letter from EPA Region 1 indicating that Exelon had satisfied the consultation responsibilities under the PSD Delegation Agreement between EPA and MassDEP.

The following sections describe how Exelon met the National Historic Preservation Act, Endangered Species Act, and Tribal consultation requirements identified in the PSD Delegation Agreement and describe other consultations.

A. National Historic Preservation Act Consultation

Exelon sent a notification letter regarding the submittal of the PSD air permit application to the Massachusetts Historical Commission, as identified by the PSD Delegation Agreement and required by the National Historic Preservation Act consultation requirements. Exelon also sent notification letters to the Tribal Historic Preservation Officers of the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe.

None of those contacted requested further consultation.

B. Endangered Species Act Consultation

Exelon searched the U.S. Fish and Wildlife Service ("FWS") Information, Planning and Consultation website and identified the Northern Long-eared Bat ("NLEB") as the only potential federal listed species in the area. Exelon submitted an analysis to FWS demonstrating the Project is not likely to have an effect on the Northern Long-eared Bat.

The FWS delegated responsibility for confirming the presence of the NLEB to the Massachusetts Division of Fisheries and Wildlife ("the Division") and forwarded Exelon's analysis. The Division responded that their database does not contain any state-listed species in the immediate vicinity of the Project site. State-listed species are also federally-listed species. The Division response demonstrates there is no impact to the NLEB or any other endangered species from the Project.

Exelon submitted notice of the Project to the National Oceanic and Atmospheric Administration Fisheries Service and to the Northeast Regional Office of the U.S. Fish and Wildlife Service.

Neither agency responded to the notification letters.

C. Tribal Consultation

Exelon sent letters of notification regarding the submittal of the PSD air permit application to the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah).
Neither tribe responded to the notification letters.

D. Class I Area Modeling

Exelon completed a Request for Applicability for Class I Area Modeling Analysis Document with regard to Class I areas in Vermont and New Hampshire and submitted it to the Eastern Regional Office of the US Forest Service. A Forest Service representative responded that the Forest Service would not be requesting Air Quality Related Values analyses of the Proposal.

E. Magnuson-Stevens Fishery Conservation and Management Act

EPA Region 1 staff reviewed the proposed project and concluded that the Magnuson-Stevens Act requirements do not apply.

XII. COMMENT PERIOD, HEARINGS AND PROCEDURES FOR FINAL DECISIONS

All persons, including the Applicant, who believed any condition of the Draft PSD Permit was inappropriate was required to raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, 5:00 PM on Wednesday, November 23, 2016 to Roseanna E. Stanley of MassDEP at the address listed in Section XIII of this Fact Sheet.

Notice was also given that MassDEP would hold a public hearing to receive public comments on the Draft PSD Permit as well as the Proposed Air Quality Plan Approval before issuing any PSD Permit and Air Quality Plan Approval. The public hearing was held November 15, 2016 at 7:00PM at the Medway Middle School Auditorium, 45 Holliston St in Medway, MA.

Persons could arrange to view copies of the Draft PSD Permit, thePSD Fact Sheet, the Proposed Air Quality Plan Approval and Exelon's applications at MassDEP's Central Regional Office located at 8 New Bond Street, Worcester, MA between 9:00 AM to 4:00 PM by calling the Central Region Records Coordinator at 508-767-2716. Copies of these materials were also available on MassDEP's website at:

http://www.mass.gov/eea/agencies/massdep/news/comment/exelon-west-medway-facility.html

Copies of the Draft PSD Permit, the PSD Fact Sheet, the Proposed Air Quality Plan Approval and Exelon's applications were available for review at the Medway Town Clerk's Office located at 155 Village Street, Medway MA and at public libraries in Medway, Millis, Bellingham, Milford and Franklin.

[Note: the notification below will appear in the Final PSD Permit. MassDEP is providing the notification in this PSD Fact Sheet so that interested persons will understand the applicable appeal process for any PSD Permit that may issue following the Public Hearing and Comment Period.]

Along with the Final PSD Permit, MassDEP is notifying each person of their right to appeal the issuance the Final PSD Permit, in accordance with 40 CFR 124.15 and 124.19 as follows:

1. Within 30 days after the issuance of a final PSD Permit decision under 40 CFR 124.15, any person who filed comments on the Draft Permit or participated in any public hearing may petition EPA's Environmental Appeals Board (EAB) to review any condition of the Permit decision.

2. The effective date of the Permit is 30 days after service of notice to the Applicant and commenters of MassDEP's final decision to issue, modify, or revoke and reissue the Permit, unless review to the EAB is requested on the Permit under 40 CFR 124.19 within the 30 day period.

3. If any person appeals the Permit to the EAB, the effective date of the Permit is suspended until the appeal is resolved.

XIII. MassDEP CONTACTS

Any person may obtain additional information concerning the Final PSD Permit between the hours of 9:00 AM and 4:00 PM, Monday through Friday, excluding holidays from:

Roseanna E. Stanley, Permit Chief
Bureau of Air and Waste
Massachusetts Department of Environmental Protection
Central Regional Office
8 New Bond St.
Worcester, MA 01606
508-767-2845
Roseanna.Stanley@state.ma.us